

HARPOON

OPERATIONS MANUAL



HARPOON

Operations Manual



Credits

**Three-Sixty**

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Campbell, CA 95008

Harpoon Rules by: Larry Bond

Published by: Game Designers' Workshop

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Published by Three-Sixty Pacific, Inc.

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If you have questions regarding the use of Harpoon™, please call
Harpoon Customer Support line between the hours of 9:00 AM and
7:00 PM Central time, Monday through Friday.

409-776-2187

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Texas A&M University

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Publisher's Note



The development of the *Harpoon* computer simulation is the result of the combined efforts of many people over the last 30 months.

While many individuals played a role in this ambitious project, we would like to acknowledge and for you to recognize those few who, without their efforts, *Harpoon* could not have become a reality.

Gordon Walton, who performed as our crisis manager as well a programmer and designer, was instrumental in leading the development team during the last nine months of the project. Of the team members in particular, Mike Jones and Becky McGuire gave an exceptional effort under very difficult working circumstances.

Our artists, Dale and Jimmie Homburg, gave the *Harpoon* simulation vibrant and detailed art. Les Hill, a programmer, stuck to it during the entire two and one-half years of the project. Rob Brannon's elegant menu interface has become an important feature of *Harpoon*.

Larry Bond and Tom Clancy had important roles, also. Larry, the designer of the *Harpoon* board game which is used to model the computer simulation, has provided considerable personal, professional, and financial support to each member of the project throughout its entire length. Tom Clancy has indeed "given something back to America" with his financial assistance on the project and his well-appreciated words of encouragement.

Don and Bruce Gilman of Applied Computing Services, Inc., had the faith in Three-Sixty to choose us as the Publisher of the *Harpoon* computer simulation from rights granted to them from Game Designers' Workshop. Thank you, Bruce and Don, for giving us the opportunity to create this magnificent product.

Sincerely,

Tom Frisina, President
December 1989



Preface:

Organization of this Manual

Welcome to the most realistic naval war simulation on the market! To help you get started, we want to review the organization of this manual so that you will get the most enjoyment from the game simulation.

The introductory material will familiarize you with the basic concepts around which *Harpoon* is designed. You will find instructions on how to load it, a description of the screens on which it is played, and some things that you'll need to keep in mind when playing. We have included a sample scenario in Quick Start. If you are particularly anxious to play we suggest that you first follow along with this sample scenario before attempting the more complicated scenarios.

Appendix A provides background information on the realities of geopolitics as related to modern conventional warfare, the capabilities of today's weaponry, and the real-world strategies which would be employed by both NATO and the Soviet Union in the event of actual hostilities. This appendix is somewhat technical in nature and will probably appeal mostly to the wargaming aficionado. But, while this section is not critical to being able to play *Harpoon*, the information will help you to get the most enjoyment from it because it will help you to understand what the basis is for modern tactics. **It is important to remember that since *Harpoon* is a simulation and not an arcade-style game, it is designed to reproduce actual tactics.** For instance, you might order an ASW (anti-submarine warfare) helicopter to attack a submarine, yet it might appear that the helo is aimlessly wandering around instead of carrying out its attack order. But if you read Appendix A, you will understand how things really work in modern warfare. That is, you would realize that the helo is actually flying to different locations, dipping its on-board sonar into the water, and trying to get a solid fix on the sub's location so that an attack can be launched. So take some time to read this Appendix if you want to understand the basis on which *Harpoon* is designed.

Appendix B is a glossary of the terms, abbreviations, and acronyms found in this manual. Please refer to it if you have questions.

Since *Harpoon* is menu-driven, the technical aspects of controlling it are fairly easy. However, the realistic situations you will encounter, combined with user-selected options and variable screens, make *Harpoon* a continuing challenge even for the seasoned expert.

Foreword - by Tom Clancy



I met Larry Bond as the result of an accident. Soon after joining the U.S. Naval Institute, I saw in their monthly journal, *Proceedings*, a small advertisement for the original *Harpoon*. I hadn't played war-games since college days, but I knew that there had to be something better than those, and I figured that for ten dollars or so, I couldn't go too far wrong. On receiving the game, and reading it over a period of days, I availed myself of the comment sheet tucked in the back to offer a suggestion. I saw what I thought was an error in the damage points section, and pointed it out, along with some complimentary remarks on the overall quality of the concept. Larry replied almost at once, confirming that there was a goof in his numbers (he was in the process of doing a correction). The ready admission of error told me everything about Larry that I'd ever need to know. Larry Bond is a serious student of this subject, a man for whom accuracy is more important than ego. In a word, Larry is someone of integrity. I know no higher praise.

Harpoon was a priceless asset in the preparation of my first novel, *The Hunt For Red October*. There are several reasons for this. First of all, the technical database included in the ship specification book is easily the equivalent of \$5,000 in reference books, superbly organized. More importantly, however, the game rules explain, with the astounding combination of simplicity and detail, the mechanics of ships, sensors, and weapons. The principles explained can be easily applied to specific ships, called "platforms" by insiders, found in the ship specification book. *Harpoon* is a tool for understanding things that happen in the real world. The player can use this game to simulate reality. How closely, you ask? Closely enough that every naval officer I meet in more than one navy asks where I got my information; and frequently they don't believe my answer. The net result, however, is that *Red October* is now used as an introductory textbook at the Naval War College, Newport, RI. A lot of credit for this goes to Larry Bond. In short, *Harpoon* is almost certainly the best naval simulation available to the public. The only games more detailed are classified, which does not necessarily mean "better," by the way, and a lot more expensive. It is the perfect starting point for discovering what navies do, and how. It worked for me.

Tom Clancy
Prince Frederick, MD
19 Sept 1989



A Final Note From Larry Bond

Harpoon, the computer product, is a sophisticated version of the award winning wargame published by Games Designers' Workshop. You will assume the role of a fleet commander, making the same type of decisions he has to make, using the same type and quality of information he might expect to get in wartime. This does not mean worrying about the fuel state of a helicopter somewhere, or the present course and speed of a maneuvering ship. You are trying to keep the Big Picture, and move the course of the war in the direction desired.

We want you to have fun playing *Harpoon*. After all, that's why you bought it. But with that requirement satisfied, we want you to see some of the tactical and strategic problems that a modern formation commander faces. A modern carrier battlegroup has tremendous combat power, but also some very real limitations.

You must learn to overcome your weaknesses and work with your strengths. You will also be interested to know that we will be presenting new Battlesets which will allow you to expand your horizons. These new Battlesets will not require the purchase of new simulation software. Rather, they complement the product you are now holding.

Finally, if you have questions or comments, please let us know. If you don't understand something, we'll try to explain it. Suggestions, information, and constructive criticism are all equally welcome. We can be reached by surface mail c/o Three Sixty Pacific, Inc., 2105 S. Bascom Ave. Suite 380, Campbell, CA, 95008. Or through GENie at Mail address: HARPOON.1. If you do not have a GENie account, call 1-800-638-9636 to arrange for one.

Larry Bond and Don Gilman, September 1, 1989



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THE CONTEMPORARY NAVAL WARGAME

There are two types of wargames which rely on the use of actual data: historical and contemporary. Historical wargames re-enact encounters set in the past, the object being to see how your decisions might have effected the course of history. Historical naval wargames benefit from hindsight and the historical record. On the other hand, a contemporary naval wargame can be defined as a set of rules that simulates naval combat of the current era. There is little historical data from which one can benefit. Mostly, there is only raw unclassified data on the capabilities of the contestants. There is no history as to what might constitute a "good" decision or a "bad" one; the results of the contest itself will bear the answer. Consequently, there are two tests a contemporary naval wargame must meet: whether it can accurately duplicate existing naval scenarios, and whether it can accurately predict future ones. In this regard, *Harpoon* is the most sophisticated and realistic contemporary wargame available to the public at this time.

Larry Bond's original naval wargame appeared in 1980 as a board game. It drew on the experiences of the past in an effort to produce a true contemporary naval wargame. Designed by an experienced naval officer, the game combined a simple game system with the specific details of a variety of naval weaponry. Because it was deliberately conceived as an open-ended game system, Bond's game could be fitted with new rules, statistics, or data as they became available, virtually guaranteeing that it would remain a viable, valuable resource for naval wargamers. In 1988 Larry Bond's board version of the game set the standard by winning a second N. C. Wells award at the prestigious Origin Wargaming Convention, the only game to ever do so.

Bond's game system is, at its heart, a simple one. Damage point values for ships are based on their tonnage (with suitable modifications for ship type or construction); damage inflicted by warheads and guns is based on the weight and type of the explosive.

Your computer version of *Harpoon* is identical in concept to the original game. However, it also incorporates a few convenient features which allow for greater flexibility. Some of the main differences between the board game and this computerized version are as follows:



1. The most obvious time-saving feature is that the computer will handle all the "number crunching" which is inherent in playing the board game.
2. A "layered" approach has been taken to the design of the computer version. That is, the player can choose the amount of realism and/or detail he or she desires, thus making this product an attractive challenge to both expert and novice wargamers, alike. Towards this end, you have been furnished with a "Staff Assistant". Normally, Task Force Commanders have staffs to help them keep track of the details regarding the conditions of the fleet, as well as intelligence concerning the enemy. Your Staff Assistant performs the same function. When you give an order, or ask for information, he will take care of it for you.
3. The computer allows you to command many task forces instead of just a single one.
4. The computerized version incorporates a "time-compression" feature. Normally, naval engagements in the "real world" might require several days to resolve as units travel from one point to another. To alleviate this dead-time, you can speed up computer time when nothing important is happening. The computer will automatically return you to "real time" once contact is made with the enemy. Or, you can slow *Harpoon* down whenever you want.
5. An exciting feature, especially for the wargame aficionado, is the vast amount of detailed information available on both friendly and enemy units. With the press of a key, the user can call-up various screens which detail all sorts of data on NATO and Soviet units. This makes *Harpoon* a valuable learning experience, in addition to being a challenging wargame simulation.

One further item concerning future releases should be noted. The campaign, or "Battleset" as it is called in the computerized version, furnished with your original purchase is called "GIUK - Greenland, Iceland, United Kingdom". Other battle sets simulating campaigns in other areas of the world will be offered as a separate purchase which can be run with your original software.

In short, the computerized version of *Harpoon* can assist the player in making the kinds of decisions that must be made by a ship commander or battle group commander in a modern sea battle. It shows what information the commander has, and how he uses it to make those decisions. Most importantly, it allows the player to make those decisions, and to see their results in a simulated combat setting.

While *Harpoon* is a "game", there is no built-in play balance. *Harpoon* is more accurately a simulation. The data are a reflection of real-world weapons and equipment, used with a computer system which allows them to interact. We cannot say that you will win 50% of the time. The vagaries of modern warfare do not allow for such niceties; neither does *Harpoon*. Whether or not you win will depend on the initial situation presented to you by the computer, and how well you meet the challenges of those situations.



Equipment Requirements

Minimum requirements:

- An IBM XT, AT, or compatible; or Tandy 1000 series
- DOS 2.0 or later version
- 640K of RAM, with 540K free

Note:

Use the DOS CHKDSK command to ensure sufficient memory. Minimum memory requirements for the different graphics modes is as follows:

EGA 640x350 or MCGA mode	550,000 bytes free
EGA 320x200 mode	530,000 bytes free
Tandy 320x200 mode	560,000 bytes free
CGA mode	520,000 bytes free

- Floppy disk drive(s) — See NOTE below.

Note:

1. EGA High Resolution version (640 x 350 x 16 color) requires EGA compatible card with 256K RAM, an EGA monitor, and:

- a. One 1.2MB 5.25" or one 1.4MB 3.5" drive, or
- b. Two 720KB 3.5" drives.

2. EGA Medium Resolution version (320 x 200 x 16 color), CGA version, and Tandy version require one 720MB 3.5" drive or one 1.2MB 5.25" drive.

IMPORTANT:

Harpoon will not run from 360KB disk drives.

The following components are highly recommended:

- 80286 or 80386 microprocessor
- Hard disk
- Mouse

Caution:

Do not use any RAM-resident programs (except mouse drivers) while you are running Harpoon. We cannot guarantee that Harpoon will run in an acceptable manner with any particular program of this type due to the amount of memory required and other possible program conflicts.

Installing and Loading Harpoon



Caution:

You should immediately make a back-up copy of your Harpoon disks for normal use. Make sure the original disk is write-protected before you make the back-up. After making copies, place the original disks in a safe place. The copies (working disks) are the ones you will use to run the game or install it on your hard disk.

1. We assume that you are familiar with the basic terms of your computer and are familiar with such operations as formatting disks, copying disks and using DOS commands. We also assume that you know how to work a mouse. If you have any questions on these things, please refer to your DOS manual.

2. If you are running *Harpoon* from your floppy disks, make sure that they are not write-protected so that data can be written on them during play.

3. If you are using a mouse, make sure that the mouse driver software is loaded into memory before you load *Harpoon*.

Harpoon can be played from a hard disk, from a single 3.5" 720KB or 1.4MB floppy disk, or from a single 1.2MB 5.25" floppy disk. It cannot be played directly from 360KB floppy disks.

If you purchased HARPOON on 5.25" diskettes, the files are assigned to the disks as follows:

Disk #1, Program Disk #1:	HARPOON.1
Disk #2, Program Disk #2	HARPOON.2 HARPOON.OPT GIUK.RES JOINHARP.BAT
Disk #3, Graphics Disk	GIUKTGA.RES GIUKCGA.RES
Disk #4, Program Disk & Graphics	HARPOON.EXE HARPOON.OPT GIUK.RES GIUKEGA.RES



If you purchased HARPOON on 3.5" disketes, the files are assigned to the disks as follows:

Disk #1, Program Disk	HARPOON.EXE
	HARPOON.OPT
	GIUK.RES
	GIUKTGA.RES

Disk #2, Graphics Disk	GIUKEGA.RES
	GIUKCGA.RES

INSTALLING HARPOON ON A FLOPPY DISK(S)

Using one 1.2MB 5.25", or one 1.4MB 3.5" (High or Medium Resolution EGA or CGA),

or

Using one 720KB 3.5" Floppy Diskette (medium resolution EGA or CGA):

1. Format a blank diskette in accordance with DOS procedures.
2. Copy the following files onto the blank diskette, as follows:

A. If you are copying from the 360KB disks (i.e., for medium resolution EGA, Tandy, or CGA) copy the four (4) files from the 5.25" disk #2: HARPOON.2, HARPOON.OPT, GIUK.RES, and JOINHARP.BAT. (The following instructions assume that the disk you are installing on is in drive A. If not, adjust accordingly.)

- 1) If you are installing on a 1.2MB 5.25" or a 1.44MB 3.5" disk, do the following:

- a) Copy the file HARPOON.1 from the 5.25" disk #1.
- b) From Drive A, enter the following commands:

```
joinharp
del harpoon.1
del harpoon.2
del joinharp.bat
```

- 2) If you are installing on a 720KB 3.5" disk, do the following:

- a) Place the 3.5" disk in drive A.
- b) place the 5.25" disk #1 in drive B.
- c) from drive A, enter the following commands:

```
copy /b b:harpoon.1 + harpoon.2 harpoon.exe  
del harpoon.2  
del joinharp.bat
```

B. If you are copying from the 1.4MB disk (i.e. for high resolution EGA), copy the following files: HARPOON.EXE, HARPOON.OPT, and GIUK.RES.

3. Copy one of the following files (hereafter referred to as "graphic.RES" files) to the diskette:

GIUKEGA.RES (for 640 x 350 EGA)
GIUKTGA.RES (for Tandy or 320 X 200 EGA)
GIUKCGA.RES (for CGA)

- 4. Remove the original Harpoon diskettes from your computer and store in a safe place.
- 5. Insert the diskette containing the copied files into the disk drive.
- 6. Give the command to bring up the game, as follows:

HARPOON E (for high resolution EGA)
HARPOON M (for medium resolution EGA)
HARPOON T (for Tandy)
HARPOON C (for CGA)

Using Two 720KB Floppy Diskettes (with High Resolution EGA):

- 1. Format two blank diskettes in accordance with DOS procedures.
- 2. Copy the following files to one of the formatted diskettes: HARPOON.EXE, HARPOON.OPT, and GIUK.RES.



3. Copy the file GIUKEGA.RES to the second floppy.
4. Insert the diskette containing the three files into Drive A, and the diskette containing GIUKEGA.RES into Drive B.
5. Set your computer default drive to Drive A using standard DOS procedures.
6. At the A> prompt, type **HARPOON E A B**. (E = graphics mode desired, A = location of GIUK.RES file, B = location of graphics.RES file).

LOADING HARPOON ONTO A HARD DISK

If your computer has a hard disk drive, you will want to load *Harpoon* onto your hard disk. To do so, proceed as follows:

1. From the root directory, create a subdirectory named "Harpoon" by giving the following command:

```
md harpoon
```

2. Enter the "Harpoon" sub directory:

```
cd harpoon
```

3. Insert the appropriate *Harpoon* floppy disks furnished with your purchase into drive A of your computer. Copy the disk onto your hard disks by giving the command:

```
copy a:.* c:
```

If you are installing from the 360KB 5.25" disks, enter the following commands:

```
joinharp  
del harpoon.1  
del harpoon.2  
del joinharp.bat
```

-
4. To load the software, type the following and then press **ENTER**:

HARPOON E (for high resolution EGA)
HARPOON M (for medium resolution EGA)
HARPOON T (for Tandy)
HARPOON C (for CGA)

TIPS FOR BETTER HARPOON PERFORMANCE

To achieve optimal performance with *Harpoon*, there are several things you can do.

Using More Than 640K

If you have more than 640K of Ram, you can utilize this extra memory to speed up disk reads within *Harpoon*.

Disk Caching

There are several commercial programs that allow you to use any extra memory above the 640K limit as a Disk Cache. A Disk Cache buffers the reads from your Disk Drive into the extra memory, so that items which are read most often end up being read from the extra memory rather than from the Disk Drive. This makes repetitive disk reads much faster. A Disk Cache will give a noticeable performance improvement with *Harpoon* and most of your other software, too!

RAM Disk Use

If you have more than 384K of extra memory above the 640K Dos limit (ie. a 1.5 to 4 megabyte computer), you should consider running either all or part of *Harpoon* from a Ram Disk. A Ram Disk is a portion of this extra memory, set up to look and act like another Disk Drive. If you have a Ram Disk of 1 megabyte or more, you can move all the *Harpoon* files to it and run the program. If you do not have enough room in a Ram Disk for all the files, *Harpoon* can access one or both of the ".RES" files on the Ram Disk in the following manner, assuming that your *Harpoon* program is on Drive C: in a subdirectory called HARPOON, you are running in High Resolution EGA 640x350 mode, and your Ram Disk is set up as a DOS D: drive.



GIUK.RES only on the Ram Disk:

C:\HARPOON> **COPY GIUK.RES D:**

C:\HARPOON> **DEL GIUK.RES**

C:\HARPOON> **HARPOON E D** <- this is the drive letter used to locate the GIUK.RES file

GIUK.RES & GIUKEGA.RES on the Ram Disk:

C:\HARPOON> **COPY GIUK.RES D:**

C:\HARPOON> **COPY GIUKEGA.RES D:**

C:\HARPOON> **DEL GIUK.RES**

C:\HARPOON> **DEL GIUKEGA.RES**

C:\HARPOON> **HARPOON E D D** <- these are the drive letters used to locate the GIUK.RES file, then GIUKEGA.RES file

Note:

If a copy of the ".RES" file exists in the same subdirectory as the program, it will use that file instead of the one on the Ram Disk. Experienced computer users should place these files into a subdirectory and make a batch file to copy them prior to running Harpoon. Inexperienced users should call the Harpoon Hotline for assistance.

Accelerator Boards

If you have an 8088 or 8086 based computer, you may consider one of the many 80286 or 80386 accelerator boards (or replacement motherboards) available. These boards can increase the power of your computer (the raw speed of processing) anywhere from 2-20 times. Although they are relatively expensive, they are much cheaper than buying a new computer. They will speed up all your programs, not just *Harpoon*.

Using a Mouse

If you do not have a mouse and plan to spend a lot of time with *Harpoon*, we strongly suggest you get a mouse. *Harpoon* uses a very graphical, point-and-click type interface which works extremely well with a mouse. While *Harpoon* is completely functional without a mouse, a mouse will make things much faster and easier.

The following is a step-by-step walk-through of the "Gauntlet" scenario, the second scenario in the GIUK BattleSet™. We suggest that when following the steps in this demonstration that you load the "Gauntlet" scenario in *Harpoon* and play along with the instructions. This may be the quickest way for you to learn how *Harpoon* is played. **Please bear in mind, however, that the strategy suggested in this demonstration is not necessarily the best one;** rather, our main purpose is to demonstrate how the game operates.

At various points during the simulation, the Staff Assistant will appear, notifying you of sensor contacts. We cannot say at exactly what point this will occur since it will vary somewhat each time you play. *Harpoon* scenarios are generally the same each time you play, but the enemy Groups may start in different positions each time, and take different routes, making each game a continuing challenge!

Note:

When you do get a new contact, you will see on the screen an indication of how precisely that contact is located. If you see a diamond-shaped or rectangular figure surrounding your contact, that tells you that the contact is somewhere in the diamond-shaped "uncertainty zone", and the wider the diamond the greater the degree of uncertainty. This uncertain contact can either be an area contact or a bearing-only contact. You probably have a bearing-only contact with the enemy. Bearing-only contacts are usually made by the passive sensors on your unit. If you set your sensors to "active", and if the contact is within range of your active sensor, then the diamond will disappear and you will see only the enemy group or unit icon. When this happens, you have a "solid" (ie. exact) contact. When you lose a contact, it will degrade into an area contact, with the uncertainty zone growing over time, until you either reacquire the contact or it is lost completely!


To follow along with this sample scenario, select the GIUK BattleSet, then make sure you select 'NO' for the "Auto Formation Air Cover" on the Select Game Options screen.



SELECT GAME OPTIONS	
Play Which Side?	NATO
Possible Nuclear Release?	YES
Snorkling Submarines?	YES
Realistic Weather?	YES
Normal Maintenance Failures?	YES
Start With Full Ordinance?	YES
Auto Formation Air Cover?	NO
[OK]	

Then select the "Gauntlet" scenario (number 2.0 in GIUK) by using the down arrow key, then pressing ENTER.

SCENARIO SELECTION	
1.0 Dawn Patrol, Small Missile Boat Engagement	↑
2.0 Gauntlet, Small Opposed NATO Transit	↓
3.0 Hide And Seek, Small Scale NATO ASW Sortie	↓

GIUK

SELECTED SCENARIO DESCRIPTION	
2.1 Background: The Soviets will attempt to seize Norwegian bases in any all-out-war. This will be done by physically seizing some bases and cutting off others from the rest of NATO. NATO must resupply these bases using naval convoys. The success or failure of the convoys will be of paramount importance to both NATO and Soviet Commanders.	↑
2.2 Blue Orders: You are the senior captain of a two ship frigate group. you have been assigned to escort two NATO merchant	↓

[New game] [S]aved game [B]attle Sets [Q]uit Game

1. After loading any scenario you should review your Orders (ctl-O) and your Order of Battle (ctl-B).

2.0 Gauntlet, Small Opposed Nato Transit

2.1 Background: The Soviets will attempt to seize Norwegian bases in any all-out war. This will be done by physically seizing some bases and cutting off others from the rest of NATO. NATO must resupply these bases using naval convoys. the success or failure of the convoys will be of paramount importance to both NATO and Soviet Commanders.

2.2 Blue Orders: You are the senior captain of a two ship frigate group. You have been assigned to escort two NATO Merchant ships north along the Norwegian coast from Trondheim to Narvik

2.3 Intelligence Brief: The Soviets are expected to offer only light opposition to the transit. Be alert for any combination of air, surface, and/or submarine attacks.

2.4 Minimum Victory Conditions: Reach narvik with at least one of your merchant ships.


[OK]

In this scenario, you are escorting two merchant ships to Narvik. Your Order of Battle shows the port of Narvik, two frigates (Type 22/2 and O.H. Perry classes), two merchant ships and four helicopters (on the two frigates). Select the surface group with call sign AAS, then either use the TAB key to switch to the Unit window (or use your mouse to click on the first Unit).

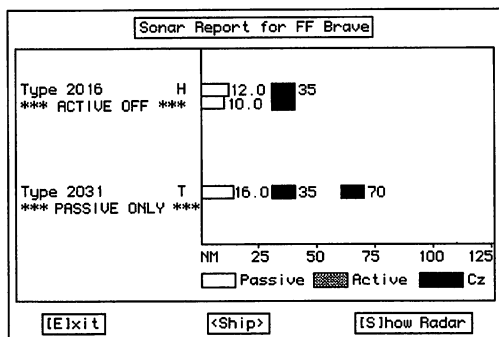
Now you can get a unit report on the Type 22/2 by pressing 'R' (or use your mouse to click on the Unit [R]eport button).

Order Of Battle			
NATO Groups		Unit	%Dmg #
Port:	ABp	00: FF Type 22/2/Brave	0 --
Surface Group:	RAS	Navl Lynx HAS.3	-- 1
		01: FFG O.h. Perry/Boone	0 --
		Navl SH-60B Seahawk	-- 2
		02: MRCH Merchant/Mercha	0 --
		03: MRCH Merchant/Mercha	0 --
		04: Navl Lynx HAS.3	0 1
[E]xit		Unit [R]eport	

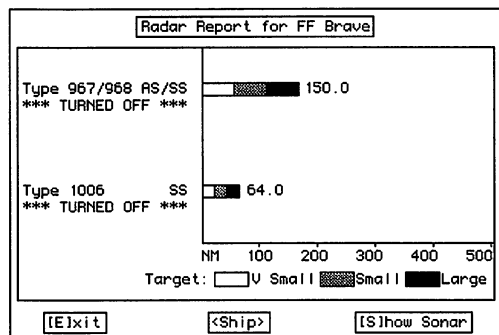
Notice that all sensors are off except your Passive Sonar and that you have only short range (SR) weapons (short range weapons are generally under 30 nm in range). Check your sensors by pressing 'S' (or clicking on the [S]ensors button). You will get your Radar Report screen.

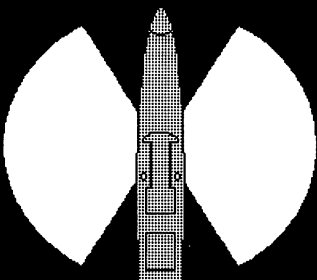
		Class: FF Type 22/2 Country: UK Length: 148 meters Displacement: 4100 tons Damage Points: 146/146 Maximum Speed: 30/30 kts
<p>The second batch of the Broadsword class, the type 22/2 is constructed with a longer hull to improve its seaworthiness and to provide room for a towed-array sonar. this dramatically improves the ship's effectiveness as an ASW platform while retaining its formidable point defense capabilities. the Type 22/2 should be placed at least 30 nm (one C2) away from the noisy main group in order to avoid interference with its sensitive</p>		
SENSORS SUMMARY		WEAPONS SUMMARY
	Range % Det Air Radar: -- -- Surf Radar: -- -- Active Sonar: -- -- Passive Sonar: 16 50	SR LR AAW: 18 0 ASuW: 6 4 ASW: 6 0
[E]xit		[S]ensors
		[W]eapons

As you can see both radars are turned off. You have two different radar sets: one combination air and surface search radar (AS/SS), the other a surface search radar (SS). The range of the radar against different sizes of targets. Also remember that Radar is limited by the Radar Horizon, regardless of the range it can potentially reach. Now we can look at our sonars by pressing 'S' (or clicking your mouse on the [S]how Sonar button).



Notice the active sonars are off. You have two different sonars, one a hull sonar (H) that has both an active and passive mode. The other sonar is a towed sonar (T) that is passive only. The direct path range is shown for each sonar and mode, and the sonars' convergence zone (CZ) reach is also shown. From this screen we can return to the main ship display by pressing the 'ESC' key (or using the mouse to click on the <Ship> button. Once back at the unit display screen, press 'W' to look at your weapons (or click the mouse on the [W]eapons button.





FF Brave

- 2 * GAM-B01 20mm/80 Gun
- 1 Barrel
- 2 * Mk4 20mm/80 Gun
- 1 Barrel
- 2 * Mk32 324 TT
- 3 Tubes
- 2 * Mk7 40mm/60 Gun
- 1 Barrel
- Helo Pad
- 1 Pad
- MM38 Exocet Launcher
- 1 Tube

Ammunition	Qty	Target	Range	Hit %	Damage
20mm projectile	160/160	SURF/2	1.1	20	2
		AIR /2	1.1	20	KILL

[E]xit
[S]hip
Ungroup Same Type [W]eapon

Using the weapons display, you can check all your weapons and current ammo levels. This screen tells you all the information about your weaponry. Selecting each weapon shows you it's arc of fire, weapon name, current ammo/initial magazine load, type of target it can engage, maximum range, % fired that will hit a target (if it finds a target), and number of damage points it can do if it does hit. Pressing the 'W' key (or clicking your mouse on the Ungroup Same Type [W]eapon button), allow you to look at the individual weapons mounts, instead of a combined display for all weapons of a given type. Pressing 'W' regroups the weapons. Once you have examined all your weapons, you can either return to the ship display by pressing 'S' (or clicking your mouse on the [S]hip button) or directly back to the Order of Battle by pressing 'E' (or clicking your mouse on the [E]xit button). Now you can examine your other platforms, just like we did for the Type 22/2 Brave. Examining and understanding the capabilities of your platforms is absolutely key to effectively fighting them.

2. After reviewing your forces you will notice that the Designation Square and the Unit Window on the Group Map are centered on NATO Port with call sign ABp in Narvik, Norway. This is your desti-

nation, as stated in your scenario Orders. Notice that to your north is a red triangular figure. Use the BACKSPACE key to cycle the designation pointer to that triangle (or, if you are using a mouse, point to it and "click" the left button). When you do, you will notice from the small Reports Window that it is USSR Airfield with call sign ZXa in Banak, Norway. Press the 'F' key (or click your mouse on the [F]ull Report button).

As you can see, Banak has an estimated 6 enemy attack aircraft, active radar and no known damage.

Current Status for USSR Airfield: ZXa							
Base Name: Banak, Norway							
	Fgtr	Bmbr	Atk	ASW	EW	AEW	
Est. Numbers	0	0	6	0	0	0	
Radar Active? YES							
Base Known to be Damaged? NO							

3. Press the BACKSPACE key once again. The Designation Square will cycle to a group of ships to the south. The small Reports Window shows that this is NATO Surface Group with call sign AAS, comprised of 4 ships and 4 helicopters.

4. Press the "C" key. The Unit Window indicator on the Group Map will immediately center itself around your selected surface group, and the group will be shown on the Unit Map. Give the [F]ull Report command; a report will appear in the report window indicating that your groups' radars are in STANDBY and that our sonars are in PASSIVE mode.

5. You need to select your Staff Options from the Settings menu (alt-M). Note that you can select and deselect certain Staff options. Make sure that the "Repeatable Air Patrols/Attacks" is 'x'ed and that the "Enable Air Intercepts" is empty by clicking on it if you have a mouse (if no mouse, use the down arrow key, when the item is highlighted, press the SPACEBAR to toggle it on or off).

—Staff Configuration—	
<input type="checkbox"/>	Ignore New Ship Contacts
<input checked="" type="checkbox"/>	Ignore Ships Running Around
<input type="checkbox"/>	Ignore Ships Too Deep
<input type="checkbox"/>	Ignore No Movement Orders
<input checked="" type="checkbox"/>	Repeatable Air Patrols/Attacks
<input type="checkbox"/>	Enable Air Intercepts
<div>[OK]</div> <div><Cancel></div>	

After turning these options on, press the ENTER key to accept your Staff Option changes.

6. Now we must make our first tactical decision. What do we want to do with our radars and sonars? If we leave them off then we will be operating with just our passive sensors; that is, we will be "listening" but not "seeing". The advantage of running with sensors deactivated is that the enemy cannot detect our emissions, and as shown in Section F - Sensors, we can detect his emissions long before he can detect ours. On the other hand, it is possible that the enemy is running with his sensors off. Also, even if we do happen to detect an enemy's sensors we will have only moderately reliable range and bearing information. But, let's leave our radars off for the time being.

7. We have a slightly different problem with regard to our sonars. It is difficult to judge at exactly what distance we could expect to detect an enemy, either with our active or our passive sonars. Anti-submarine warfare is extremely complex and problematical because the ocean has temperature layers (thermoclines) which can distort or block sound waves. No doubt the enemy's subs can pick up the noise from our convoy's screws (propellers) long before we could ever hope to detect him with our own sonars. On the other hand, the noise from our own screws are very liable to mask any noise we could hear from an enemy sub, particularly if we are traveling at the rather brisk speed of 18 knots. Now let us slow down our convoy so that we can increase our chances of detecting the enemy. Drag down the Orders Menu and select Set Group Speed (or press F2). The Set Speed box will appear in the Reports Window. Use the BACK-SPACE key to erase 20 kts from the Speed line, then type in the number 16. This should increase our probability of detection without slowing down our group too much. We will also leave our sonars in passive mode for the time being.

8. Since our intelligence brief on the Scenario Selection Screen told us that we could expect surface, air, and subsurface threats, we will want to position our units so that we can protect our convoy of transports. Also, we will want to make sure that the helicopters have a load-out appropriate to the situations we can expect to face.

a. First, let us see what load-out our helicopters currently have. Press F5 (or drag down the Orders menu and select Ready Aircraft). You will then be presented with the Ready Aircraft screen.

READY AIRCRAFT				
#	Type Aircraft	Loadout	Status	Time
2	Navl Lynx HAS.3	Antisub	Ready 5	0
2	Navl SH-60B Seahawk	Antisub	Ready 5	0

Ammunition	Qty	Target	Range	Hit%	Damage
Stingray Torpedo	2	Sub	6.0	70	23
Sonobuoy	12	N/A	N/A	N/A	N/A

[OK] [R]eady <Cancel>

You can immediately see that all of your helicopters are equipped for antisubmarine warfare and are in a "Ready 5" status (can be launched in 5 minutes or less). Now we need to make a tactical decision; Do we want to commit all our helicopters to ASW duties, or do we want to be load one or more out for a possible surface threat? We will loadout one with surface missiles and have it ready to launch, and use another as an early warning picket.

b. Use the arrow keys to highlight the Navl Lynx HAS.3, then give the [R]eady command. A small dialog box will appear in the middle of the screen. Use the BACKSPACE key to erase the number 2 on the "To ready" line, then type in the number "1" (we want only one helicopter loaded to attack surface ships).

READY AIRCRAFT				
#	Type Aircraft	Loadout	Status	Time
2	Navl Lynx HAS.3	Antisub	Ready 5	0
2	Navl SH-60B Seahawk	Antisub	Ready 5	0

Available aircraft: 2

To ready: 1

<Cancel> [OK]

Ammunition	Qty	Target	Range	Hit%	Damage
Stingray Torpedo	2	Sub	6.0	70	23
Sonobuoy	12	N/A	N/A	N/A	N/A

[OK] [R]eady <Cancel>

Lynx HAS.3			
Loadout	Range		
Search	288		
Ferry	360		
Guided	288		
Antisub	288		

Ammunition	Qty	Target	Range	Hit%	Damage
Sea Skua	4	SURF	8.0	80	4

[OK] <Cancel>

Then press the ENTER key to select OK. When you do another box will appear which lists the types of missions a Lynx can accomplish. Use the cursor to highlight "Guided" and again select [OK].

READY AIRCRAFT				
#Type Aircraft	Loadout	Status	Time	
1 Nav1 Lynx HAS.3	Antisub	Ready5	0	
1 Nav1 SH-60B Seahawk	Antisub	Ready5	0	

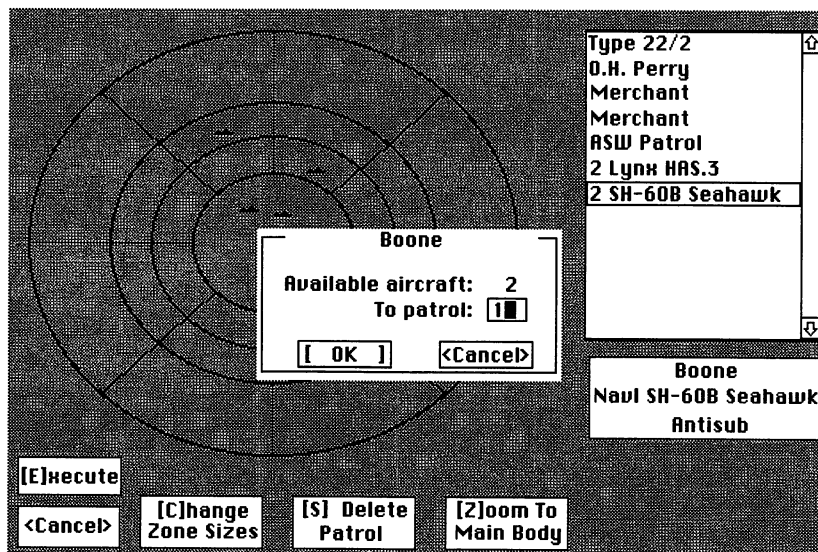
Ammunition	Qty	Target	Range	Hit%	Damage
Stingray Torpedo	2	Sub	6.0	70	23
Sonobuoy	12	N/A	N/A	N/A	N/A

[OK] [R]eady <Cancel>

Once you do, you will be returned to the Ready Aircraft screen. Notice that your Lynx which has the guided mission will be ready in 30 minutes.

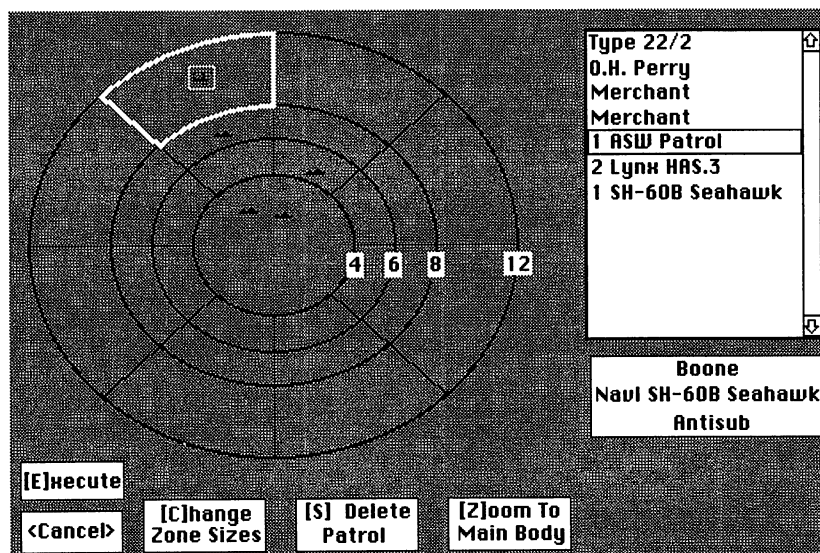
Now select the other Lynx and give the [R]eady command. When the mission loadout selection screen appears, select the "Search" Loadout. Note that it has the same range (288 nautical miles) as the AntiSub Loadout which is already loaded! Lets leave this one the way it is and we will send it out as a scout with an AntiSub Loadout. Press Escape or click on the <Cancel> command to return to the Ready Aircraft screen, then press ENTER to exit to the Main Screen.

c. Now we can launch a helicopter within our formation to perform ASW patrol duties. Drag down the Orders Menu and select Formation Editor. Use the "down" arrow key to highlight "2 SH-60B Seahawk", then select [S]et Air Patrol.



The selection for how many aircraft to patrol will be shown. BACK-SPACE over the "2" and type in "1" as shown above. Press the ENTER key (or click your mouse on the [OK] button) to accept one aircraft for the patrol.

Now you will see a helo symbol appear in the middle of the formation and a new entry will appear in the scroll box labeled "ASW Patrol".



Locate this helo in the outer sector (Picket Ring) of the same ring as the Brave by clicking in the sector if you have a mouse (without a mouse, press ENTER then use the arrow keys to move it to the location, then press ENTER again).

Now select [E]xecute by pressing the "E" key (or clicking your mouse on the [E]xecute button). You will be returned to the main screen where you can see in the Unit Window that the helo has been launched.

Show Range Circles		
Blue	Red	Which Circles to show
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Best Surface Missile
<input type="checkbox"/>	<input type="checkbox"/>	Best Air Missile
<input type="checkbox"/>	<input type="checkbox"/>	Best ASW Weapon
<input type="checkbox"/>	<input type="checkbox"/>	Best Active Surface Radar
<input type="checkbox"/>	<input type="checkbox"/>	Best Active Air Radar (all 5 Altitude Bands)
<input type="checkbox"/>	<input type="checkbox"/>	Best Active Sonar
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Best Passive Sonar
<input type="checkbox"/>	<input type="checkbox"/>	Total Airborne Range
<input type="checkbox"/>	<input type="checkbox"/>	Airborne Mission Radius (minus fuel to base)

[OK] [Cancel]

9. Now we should set up the Range Circles so we can play effectively. Pull down the Range Circle menu item (alt-R from the keyboard) under Settings. For now, let's set them as indicated below:

Best Surface Missile for both Blue and Red.

Best ASW Weapon for Blue

Best Passive Sonar for Blue

10. Now that we have things set up the way we want them, slowly compress time to speed up the game a little bit. Press the "Q" or "+" key until time compression is set at "5 min". In a few seconds your message will appear on the message bar to let you know that your Lynx on the Brave is ready. Since we will want to send it off on a search mission, press the ENTER key to return to a 1-to-1 time ratio.

11. Now launch this Lynx on its search mission. Drag down the orders menu and select Launch Aircraft (F6). A box will appear in the Reports Window listing the three possible launch aircraft missions.

Select Destination Type

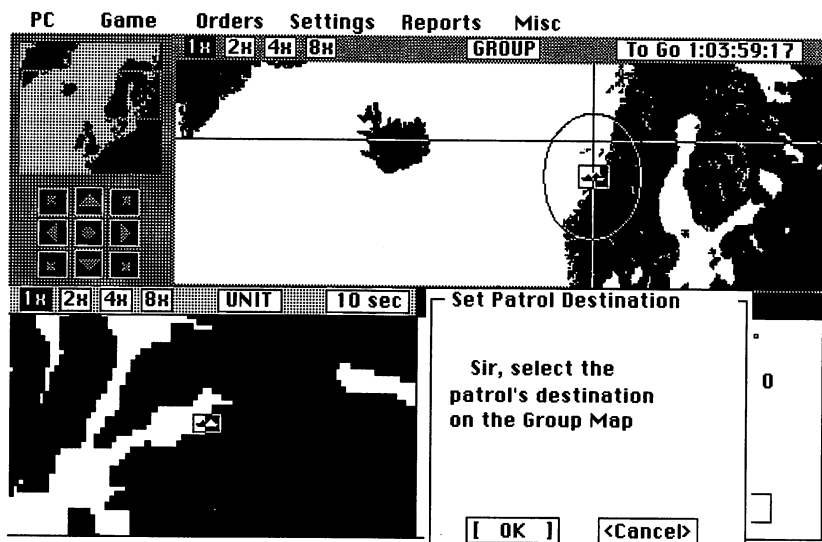
☐ Attack

☐ Ferry

☒ Patrol

[OK] <Cancel>

Select Patrol, then give the [OK] command. Next to appear is a dialog requesting you to enter the position for your patrol. The Circle you see is the range of your longest range aircraft. Click the mouse (or move the crosshairs) to about half the radius of the circle, directly North of your Group, then select [OK]. The next screen to appear is the Launch Aircraft screen.



MISSION: PATROL Launch Aircraft
 Target Range: 103nm
 Fuel Range Needed: 205nm

Ready Air Assets	Launching Group
1 Hawk SH-60B Sea Antisub	1 Lynx HAS 3 Antisub

Move>> <<Move

[OK] [Repeat Attack] <Cancel>

Highlight the Lynx with the AntiSub mission in the Ready Air Assets box, then move it to the Launching Group box by pressing the "." (period) key. Now select [OK].

12. Notice on the Group Map that a helo symbol begins to separate itself from the ship symbol. Use the BACKSPACE or SPACEBAR key to select the helo. The report window shows that it is NATO Helicopter Group with call sign ACH.

a. Since we are trying to find a surface enemy, let's turn the radars on for this helicopter. Since it is already the selected Group, just pull down the Orders menu, selecting the Sensors item.

Set Group Sensors
 Group: ACH

Air Search Radar
☐ Off ☐ Active ☐ Hidden

Surface Search Radars
☐ Off ☒ Active ☐ Mixed

Active Sensors
☐ Off ☐ Active ☐ Hidden

[OK] <Cancel>

You will get the Set Group Sensors dialog as shown. Set the Surface Search Radars to Active then select [OK].

b. At this point increase time compression to "1 min". After a minute or two your staff assistant will appear to inform you that a Soviet Nanuchka has been detected. The Group window will show a red surface symbol enclosed in a red square. This red square is the "uncertainty zone", meaning that the vessel was detected by passive sensors and that its exact location is uncertain. But you know the enemy is out there somewhere in the general vicinity! Select [1:1 TIME] by pressing the ENTER key.

13. Continue closing until you have a solid fix on the enemy, then use the Set Altitude and Speed order to hover your helicopter. This gives you targeting information on the enemy ships and will allow us to attack them using other means.

14. Since we are too far away to shoot our shipborne missiles, let's launch the helicopter we have ready with the Guided Loadout. Select your ship group, then select the Launch Aircraft order. Select Attack for the launch mode, and the enemy ship group as the target. Then launch the Lynx with the Guided Loadout.

15. Once your Lynx with the Guided Loadout is airborne, select it using either the mouse or the space/backspace keys. Set its speed to military to get it to the target faster, and make sure it has all sensors OFF so that the enemy ships do not detect it as quickly. Once you get close to the enemy ships (about 20 miles) you may want to set your altitude to VLow (very low) to avoid radar detection for as long as possible.

At this point, we cannot guide you any further because the game you are playing may not proceed exactly the same from this point onward. However, you can play around with the various commands and menus. Use this opportunity to see just what you can and cannot do.

The more you play *Harpoon*, the more you will discover the various uses of the commands. There is such a wealth of detail built into the internals of the simulation that it may require you to play scenarios 1 through 4 many times just to discover *Harpoon's* capabilities. We recommend that you become comfortable with the first four scenarios before you attempt the more complicated ones.

Once you feel that you are familiar with how *Harpoon* is played, you will be ready for the greater challenges presented by the more difficult scenarios. You might want to play these scenarios in numerical order. This order is roughly equivalent to the order of the situations which might be face by NATO forces according to the US Navy's Maritime Strategy, and it will give you a good feel for how a war really might be conducted in a real-life situation. Also, the later scenarios are generally laid out in order of graduating difficulty and complexity.



Of course, if you "lose" a particular scenario it will have no effect on the outcome of any subsequent scenario; and you can replay any scenario as many times as you wish. Keep in mind, however, that even though you may replay a certain scenario, the computer will not necessarily set up the situations or the forces in exactly the same way each time. Consequently, you cannot always be sure that the tactics you used for winning a scenario one time will always work each succeeding time.

Good Luck to you. Your alliance depends upon your skill!

An Overview of Harpoon's Operation



GAME ELEMENTS

Your Role

In computer Harpoon you play the role of a Side Commander, commanding all naval and air units for one Side of a scenario. Because the scenarios can vary from a single ship Group to multiple ship Groups and bases, the scope of the role you play can vary immensely. Your job is to direct all the Groups within your control to achieve the task set in your scenario orders.

Groups, Units & Classes

Understanding Groups, Units and Classes is the key to effectively playing Harpoon.

A Class is a single platform type, such as an Iowa Class Battleship, an F-15 Fighter or a Nimitz Class Aircraft Carrier.

A ship or submarine Unit, consists of a single (named) individual class member, such as the New Jersey, an Iowa Class Battleship. In an aircraft or missile Unit, a single Unit may contain multiple members (ie. six F-15 Fighters with the same Air-to-Air Loadout, or nine Tomahawk Missiles launched from the same ship at the same target would be represented by a single Unit).

A Group is the primary unit of control in Harpoon and is defined as one or more units. An example ship Group might contain one battleship Unit and two destroyer Units. As the Side Commander, you will give orders to Groups, and the (computerized) Group commander uses the individual Units to carry them out.

Sides & Countries

Three sides are modeled in each of the Harpoon BattleSets™. Sides typically represent alliances (such as NATO, Warsaw Pact, SEATO, etc...) made up of multiple countries. These three Sides are labeled BLUE, RED and NEUTRAL (colored Yellow), and all of their groups and units will be colored accordingly within the game. (Note: An uncertain contact will show up as the enemy Side/color until you establish an exact contact, this is because within the game you can only shoot at enemy contacts.) Each Side can have multiple countries represented, as in the first BattleSet™, GIUK, where the BLUE Side has the U.S.A., United Kingdom and Norwegian countries aligned together (while other

countries may be in the alliance, only countries with Classes used in the BattleSet™ are represented in Harpoon). Countries have many variables associated with them, including the percentage of breakdowns their equipment will experience, how effective their repair capability is, how effective their bearing only weapons are, and more!

In Harpoon you can either play the RED or BLUE side, allowing you to see the conflict and it's tactical nuances dictated by differing missions and equipment, from both sides.

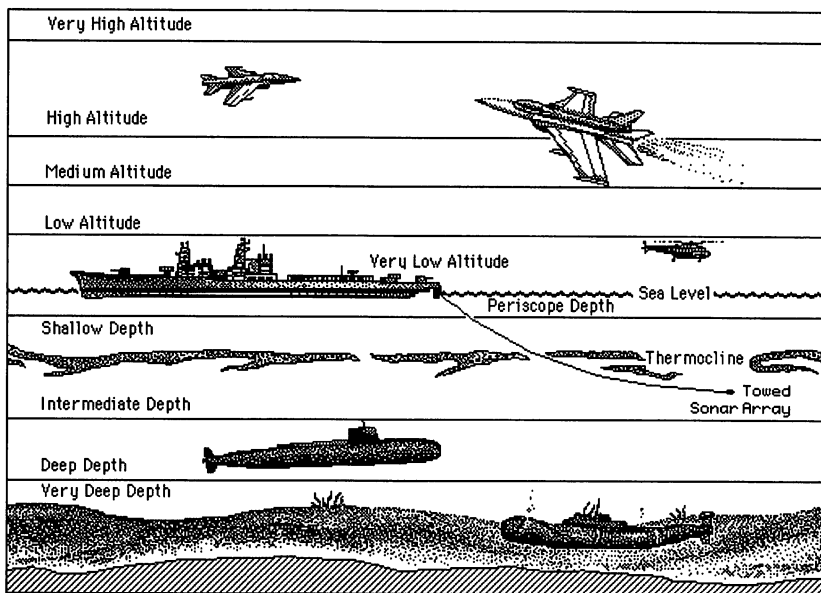
Environment

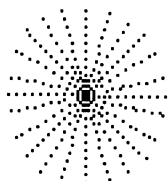
In Harpoon the environment consists of several elements. The first element is altitude (or depth). To simplify the range of possibilities, altitude bands (alt bands) are used.

- VHigh - Very High altitude is 20,000 meters and higher. Only some jet aircraft have the capability to fly at this altitude.
- High - High altitude is between 3,500 and 20,000 meters.
- Medium - Medium altitude is between 600 meters and 3,500 meters. This is the maximum altitude for all helicopters.
- Low - Low altitude is between 30 meters and 600 meters.
- VLow - Very Low, is 'wave height' or 'terrain following' flying, keeping your aircraft below 30 meters. In a fixed wing aircraft (not a helicopter), there is a significant chance that you will hit the water due to pilot error and the aircraft will be lost. The advantage is that aircraft flying at the VLow altitude can only be detected at less than half the range of an aircraft flying at Low altitude.
- Sea Level - The surface of the ocean.
- Periscope - Right below the surface where you can see out your periscope and but can be spotted by low flying aircraft.
- Shallow - Above the thermal layer, deeper than Periscope depth.

- Intermediate - Below the thermal layer, but shallower than the max safe depth for most submarines. Submarines are harder to detect when at this depth or deeper. Speeds up to 24 knots are possible without cavitating at this depth.
- Deep - The maximum safe depth for most submarines, used to evade detection. Submarines can go up to 29 knots without cavitating at this depth.
- Very Deep - Can only be achieved by a few submarine classes, and eliminates all cavitation noise.
- Too Deep - Too Deep is deeper than any submarine can go, extending to the ocean floor.

In computer *Harpoon* all the land is of uniform height, so you do not have to worry about your planes crashing into mountains. Water depth is directly relative to how close you are to land (ie. no realistic undersea maps). In general the higher you go, the easier it is to be spotted by the enemy. So Submarines tend to stay as deep as they can unless attacking, and planes tend to fly low unless searching for the enemy or trying to improve endurance.






Weather System

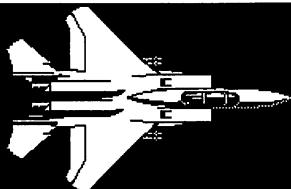
Weather systems or cells can appear in *Harpoon*, and your groups and units can be affected while within the range of the Weather Icon. Some weapons cannot be used at certain Sea States (which are directly linked to the strength of the weather cell), and you may not be able to launch some aircraft. Weather also affects sensors, making visual, radar and sonar contacts more difficult.

Weapons

Weapons within *Harpoon* are designated by the term Mount. Each Mount contains one or more weapons. A Mount also has an associated number of barrels/rails/tubes, an ammunition amount, a weapon firing arc and possibly a specific sensor for the Mount, called a director. Directors direct weapons to specific target(s), and if they are damaged the Mount may not be capable of firing at all! Note that directors can only track a limited number of targets, so a major factor in maximizing the effectiveness of your attacks is overwhelming the capacity of the defending Mounts.

To examine your weapons in computer *Harpoon* use the Unit Full Report or Display options to get to a Platform Display screen.

	<p>Class: CG Slava</p> <p>Country: USSR</p> <p>Length: 187 meters</p> <p>Displacement: 12500 tons</p> <p>Damage Points: 292</p> <p>Maximum Speed: 34</p>
<p>The Slava is the second most powerful ship in the red navy, second only to the Kirov class. It would be used as the centerpiece of a large anti-surface group, or as a formidable escort to other ships which it would screen with its comprehensive AAW systems. Although the Slava's point defenses are extremely powerful, its ASW capability is minimal and it should be paired with ASW escort vessels. There is not really a Western equivalent to the Slava because NATO uses aircraft to carry out most anti-surface attacks. In terms of AAW capabilities, the closest NATO vessel would be an Aegis ship such as the Ticonderoga. If built in the US, the Slavas would probably cost about \$750 million.</p>	
<p>[E]xit [S]ensors [W]eapons [N]ext [P]revious</p>	




Class: Fighter F-15 Eagle

Country: USA

Cruise Range: 1881 nm

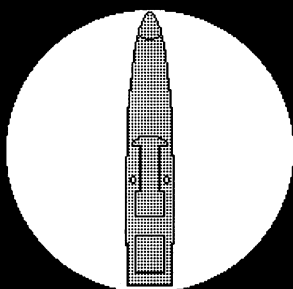
Maximum Speed: 1338



One nickname for the McDonnell Douglas F-15 is "The Starship" because of its powerful radar and large missile armament. This plane was designed as an all-weather air superiority fighter, and it is the best in the world. Although the Eagle is a huge aircraft, its large wing area and powerful engines give it exceptional maneuverability. In fact, the F-15 is a match for any aircraft currently flying, and is far better than most. Its only flaw is its size, which makes it easier to be seen when in a dogfight. The Eagle costs about \$27 million. the best Soviet match for the F-15 is the brand-new Su-27 Flanker, which first appeared about ten years after the Eagle's debut.

[E]xit
[S]ensors
[W]eapons
[N]ext
[P]revious

Choose the [W]eapons option to get to the weapons screen.
For ships and submarines you get a screen that looks like this:



CG Slava

- 3 * ADM6 630 30mm/65 pair
- 1 Rotary Cannon each
- 2 * 533mm Torpedo Tubes
- 2 Tubes each
- Helo Pad
- 1 Pad
- RBU 6000 ASW Mortars
- 12 Tubes Each
- 2 * SA-N-4 Launcher
- 2 Tubes each
- SA-N-6 Launcher
- 8 Cells

Ammunition	Qty	Target	Range	Hit %	Damage
SA-N-6 Grumble	56	SURF /4	HORIZ	60	18
		AIR /4	50.0	70	KILL
SA-N-6 Grumble	56	SURF /4	HORIZ	60	NUKE
		AIR /4	50.0	70	NUKE

[E]xit
[S]hip
Ungroup Same Type [W]eapon

While for aircraft you get a screen that looks like this:

F-15 Eagle

Loadout	Range
Ferry	2130
AirToAir	1839
LR AirToAir	2130

Ammunition	Qty	Target	Range	Hit%	Damage
AIM-7N Sparrow	4	AIR	24.0	65	KILL
AIM 9L Sidewinder	4	AIR	10.0	70	KILL
Drop Tank	1	N/A	N/A	N/A	N/A

[OK]
<Cancel>

The column descriptions in the two different weapon reports are:

- Ammunition - The type of ammunition this mount fires or carries.
- Qty - The maximum quantity of this ammo in the mount.
- Target - The type of target this mount/ammunition can shoot. It will be labeled AIR (flying targets), SURF (surface targets), SUB (submarines) or N/A (not applicable). The number following the "/" is the number of Targets that the director can track concurrently.
- Range - The range in nautical miles that the weapon can hit targets. If HORIZ is listed, the lesser of your current radar horizon or weapon range is the weapons maximum range.
- Hit % - The percentage chance that this weapon will hit if fired at a target that is within range (and if it is not shot down by the target as in the case of a missile).
- Damage - The maximum number of damage points that this weapon can inflict if it hits a target. Some weapons have KILL listed, meaning if they hit the target type, they will kill it. Another special damage type is NUKE, where nuclear explosion damage is done to the target and nearby units.

Nuclear Weapons are only available in computer *Harpoon* after you have been granted nuclear release. At some point in the game, if you choose "YES" to the Possible Nuclear Release option, you may receive nuclear release. If the enemy uses a nuclear weapon, you are automatically granted nuclear release. Any nuclear weapons carried and/or aircraft loadouts will now be available for use.

Sensors

General Sensor & Detection Information

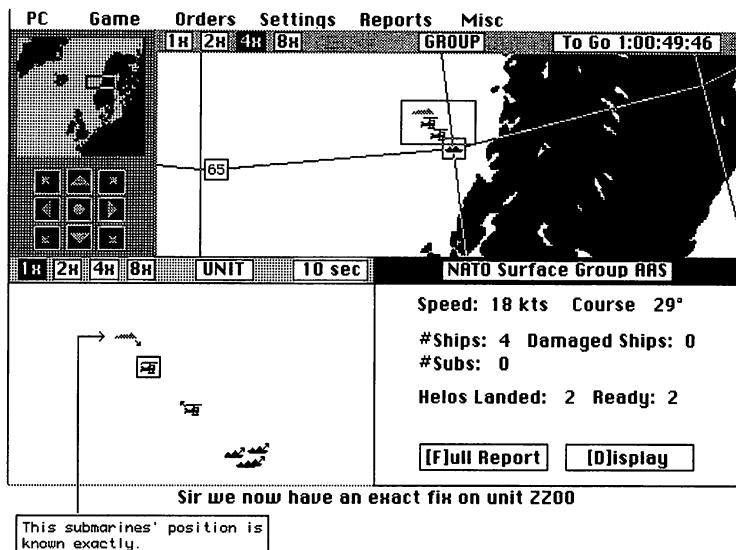
In computer *Harpoon*, enemy and neutral Groups and Units are hidden until you detect them in some fashion. Detection is always by a sensor, and the module within *Harpoon* that does the detections is called Search. Every 30 seconds of game time, each sensor on each Unit 'Searches' to see if a non-friendly Unit has been detected. Variables that affect this search process include distance, absolute size, altitude/depth, weather, and speed of both the searching and detected Units. In general, Units which are larger in size, faster moving and radiating energy (via propulsion noise or active radar or sonar), are easier to detect. A larger Unit is easier to see, and returns more energy if 'painted' or hit by radar or sonar waves. A faster moving Unit is radiating more sound energy, and the air/water it disturbs at high speeds also increases that Units' size for radar/sonar detections. Finally, a radiating Unit (radar or sonar) can always be passively detected beyond the effective range of whatever active sensor is used.

Passive & Active Contacts

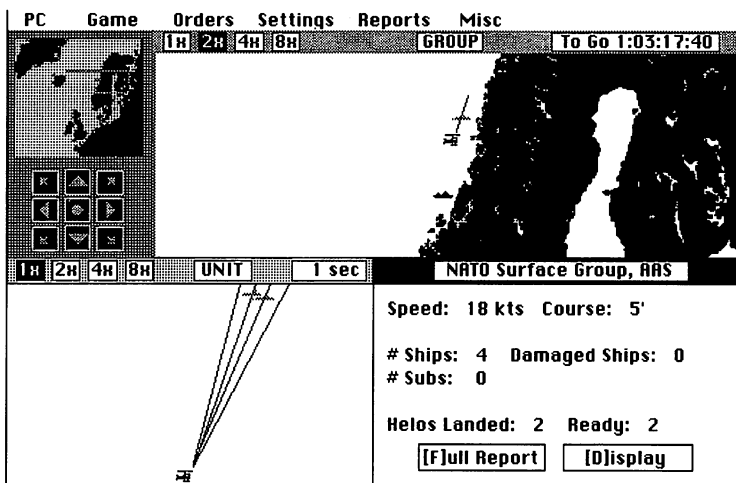
Contacts are either passive or active, meaning either you are detecting radiated energy or you are detecting reflections of your own radiated energy. When you detect a radiating target (ie. their radar or sonar is on or they are making noise based on their movement), you have a passive detection. If you are radiating (ie. your radar or sonar is on) and detect a target, this is an active detection.

Types of Contacts

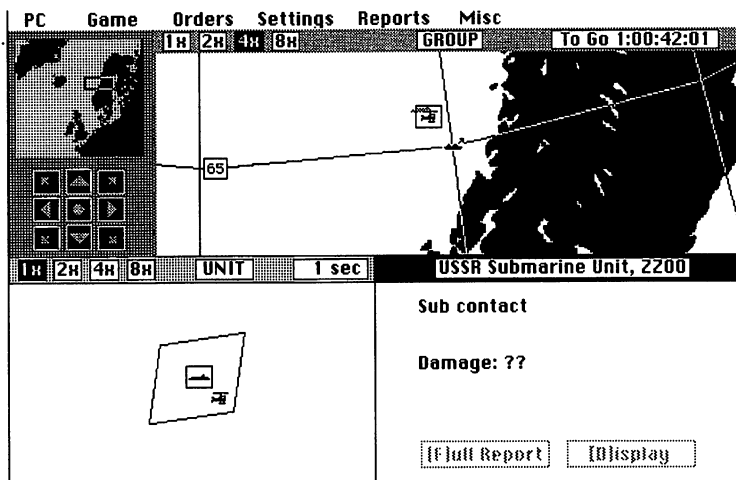
Detections of either the passive or active type can be exact, area or bearing-only. An exact detection means you know exactly where the detected unit is. An area detection means you know that the unit exists in a given area. This area is defined by a uncertainty zone or region represented by a colored diamond shape which surrounds the icon. A bearing-only detection is a special case of an area detection in which you know that a contact is a certain bearing from your position, but you only know the minimum and maximum distance it might be from you. All detections degrade over time if not repeated. As contacts degrade, the area of uncertainty will grow at the rate the detected unit could move since the last detection.



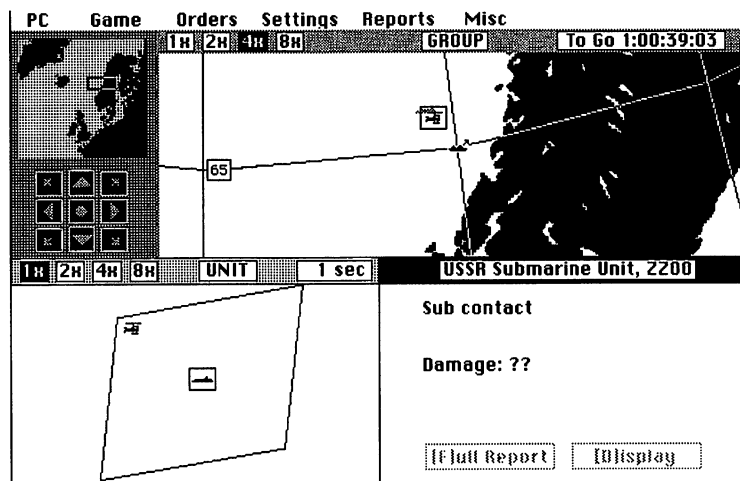
Notice that the submarine shown above is an exact detection, with no uncertainty area shown.



Notice the long diamond shaped uncertainty zones that indicate bearing-only detections.



Notice the large diamond shaped uncertainty region indicating an area contact.



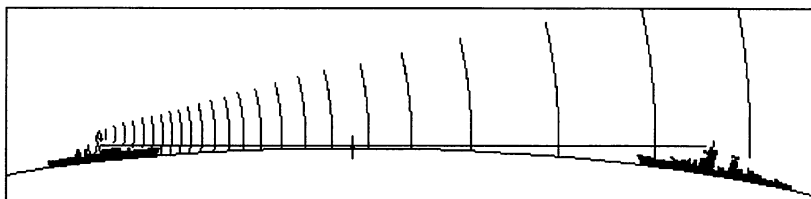
Notice how the uncertainty region has grown in the time since the last picture.

Fire Control Solutions

Fire control solutions in computer *Harpoon* are either exact, nearly exact or bearing-only. Whether a detection is from passive or active sensors is immaterial, only the accuracy and type of solution is important. Some weapons require an exact detection, others a bearing-only or nearly exact area detection. The computer determines whether you have a sufficient detection level to attack with your current weapons, and will either let you attack or inform you of an inadequate fire control solution.

Radar

Radar is the use of airborne radio waves sent out at a certain frequency, combined with a detector that listens for 'returns' of this same frequency, caused by this energy bouncing off a potential target. Radars in *Harpoon* are divided into two classes, air and surface search. Radars are limited in the distance they can be effective by the Radar Horizon.



The Radar Line of Sight table shows you the maximum distance you can pick up targets given the altitude of your radar transmitter and altitude of the target, assuming the radar would be strong enough to reach that far.

R A D A R A L T I T U D E	RADAR LINE OF SIGHT (nm)									
	Ht	Uhi	High	Med	Low	Ulow	Lrg Ship	Med Ship	Sm Ship	Peris
	Uhi	700	582	446	389	362	364	362	360	351
	Hi	582	460	325	242	219	264	242	340	231
	Med	446	325	191	134	108	109	107	105	96
	Low	389	242	134	78	51	53	50	48	40
	Ulow	362	219	108	51	25	26	24	22	13
	Lrg	364	264	109	53	26	28	26	24	15
	Med	362	242	107	50	24	26	24	22	13
	Sm	360	340	105	48	22	24	22	19	10
Peris	351	231	96	40	13	15	13	10	1.23	
Aircraft						Ships/Subs				

Air Search Radars

Air Search (AS) radars are used to locate and track airborne targets, such as missiles, planes and helicopters. Air Search radars are generally used to detect targets at Medium altitude or higher. These radars can be effective against targets at Low or Very Low altitude, but only at 5% or less of their maximum range. Three special purpose Air Search radars are the Height-Finding (HF), Range Only (RO) and the Look Down/Shoot Down (LD/SD) radars. A Height-Finding (HF) radar not only detects airborne contacts, but also determines which altitude they are at. It can also detect surface contacts. A Range Only (RO) radar can only detect targets directly in front of it, and is mainly used in aircraft as a gunsight radar. A Look Down/Shoot Down (LD/SD) radar is an air search radar (mounted on an aircraft) that has much greater capabilities than a normal airborne radar.

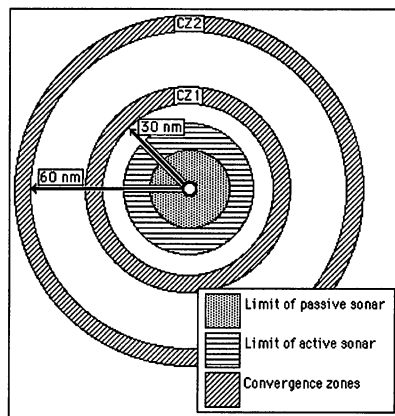
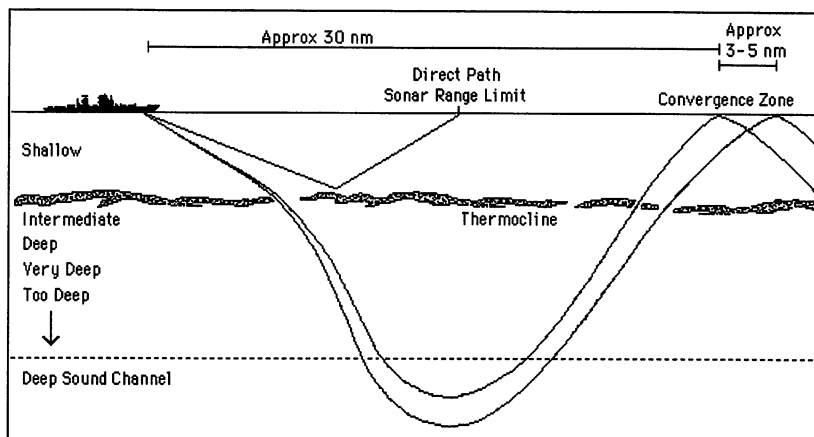
Surface Search Radars

Surface Search (SS) radars are used to detect surface Units and airborne targets at Low and Very Low altitudes. A special surface search radar is the Periscope Radar (PR) which is mounted on the periscope of a submarine and is used to help targeting submarine weapons against surface targets.

Sonar

General Sonar Information

Sonar is the use of sound energy traveling through the water to detect and track surface ships or submarines. Sonars can be passive or active. Sound travels underwater in strange ways as shown in this illustration:



As you can see, your direct sonar reflects off of the Thermocline (also called the Thermal Layer) and this limits its range. Sound that makes it through the Thermocline 'bends' back to the surface due to the immense pressure of the ocean at depths over 1,000 fathoms, then may reflect off the surface and repeat the process. This area where you can detect distant targets is called a convergence zone (or CZ). Modern sonars can sometimes detect targets out to 3 CZ's.

This illustration shows the areas where you might pick up a target, and the corresponding 'blind' zones. If the water is not Very Deep, you will not get convergence zone detections.

Passive Sonars

Passive Sonars work by listening to sounds traveling in the water, classifying them and refining the contact. The primary advantage of a passive sonar is that it does not give away your position. The main disadvantage is that it often takes a longer time to classify a target, and get an exact location on it.

Active Sonars

Active sonars work similarly to radars in that they send out sound energy and then listen for reflected returns of this sound off possible targets. The main advantage of an active sonar is that it gives exact distance and bearing information on any contact it detects. The disadvantage is that enemy Units can detect the sound energy used in active mode at 2-3 times the range an active sonar can detect a target. A common tactic is to use passive sonar to generate an initial contact, then turn on active sonar just long enough to generate an exact contact for your fire control solution.

Hull Sonars

Hull Sonars (H) are built into the hull of a ship or submarine. They usually have both active and passive sonar capability. Hull sonars have two restrictions, the first being the 'blind spot' in the Baffles, caused by propulsion noise and turbulence. The second restriction is that when you travel at or above 20 knots, the flow noise caused by water flowing over the sonar eliminates the ability to detect anything.

Towed Sonars

Towed Sonars (T) are trailed behind some ships and submarines on a long cable. Most towed sonars are always below the thermal layer, but Units with Variable Depth Sonars (VDS) can change the towed sonar depth to either above or below the layer. Towed sonar greatly increases the effectiveness of a Unit, as you have a much better chance of detecting targets below the layer. In computer *Harpoon* all towed sonar deployment

and retrieval is automatic. Each time you change course a towed sonar will stop working or work at greatly reduced effectiveness until it can straighten back out.

Dipping Sonars

Dipping Sonars (D) are used on helicopters. They are suspended on a cable and lowered into the water while the helicopter hovers. In computer *Harpoon* use of dipping sonar is mainly automatic, as any helicopter with this capability will use it if assigned to a patrol zone within the formation editor. To manually dip your sonar, hover your helicopter at very low altitude, and if your unit has a dipping sonar it will automatically lower it.

Mine Hunting Sonar

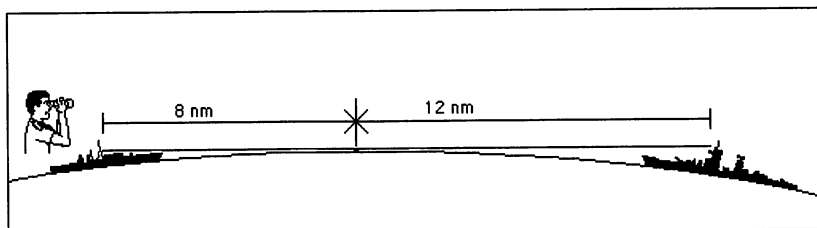
Mine Hunting Sonar (M) are used only to hunt mines, although *Harpoon* does not employ mines.

Sonobuoys

Sonobuoys (S) are small sonar sensors combined with a short range radio transmitter. Sonobuoys are dropped into the water in 'fields' of 6-12 sonobuoys by aircraft then monitored. Fields of sonobuoys only last a few hours then turn themselves off and sink to the bottom of the ocean. In computer *Harpoon* this process is automatic if an aircraft with sonobuoys is in a patrol zone within the formation editor. To manually lay a sonobuoy field, hover/loiter your aircraft, and it will lay a sonobuoy field and begin to monitor it.

Visual Detection

Prior to modern times, human vision was the only way to detect distant threats. In today's environment there are several visual methods of detection available. Human vision is limited to the Visual Line of sight and modified by time of day and weather conditions.



The Visual Line of Sight table shows you the maximum distance you can pick up targets given your altitude and the targets altitude, assuming the perfect visibility.

**V
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VISUAL LINE OF SIGHT (nm)

Ht	Uhi	High	Med	Low	Ulow	Lrg Ship	Med Ship	Sm Ship	Peris
Uhi	521	434	332	290	270	269	267	266	261
High	434	345	243	181	164	180	178	177	173
Med	332	243	143	101	81	80	77	76	72
Low	290	181	101	59	38	37	35	34	30
Ulow	270	164	81	38	19	17	15	14	10
Lrg	269	180	80	37	17	19	17	15	11
Med	267	178	77	35	15	17	14	12	6
Sm	266	177	76	34	14	15	12	10	5
Peris	261	173	72	30	10	11	6	5	1
Aircraft						Ships/Subs			

A technological addition to vision is the detection of infrared (IR) radiation (ie. heat). On some aircraft, there are Forward-Looking Infrared (FLIR) and Infrared Search and Track (IRST) sensors available. These sensor can spot surface ships and submarines on the surface or snorkling. Ships may also have passive IR sensors to detect other ships or aircraft.



Other Detection Methods

The other detection methods supported in computer *Harpoon* are described below:

Electromagnetic Intercept / Electronic Support Measures (ESM) - All combat ships of frigate size or better have ESM capability allowing them to rapidly detect any (active radar) radiating target within 110% of your current radar horizon (against the target). This is considered a passive radar detection, comparable to a passive sonar detection.

Magnetic Anomaly Detectors (MAD) - Some ASW aircraft carry a sensor which can detect large metal objects which are close beneath them under the surface of the water. The aircraft must be at a low or very low altitude for this sensor to be effective. Some submarines have titanium hulls which greatly reduce the effectiveness of this sensor.

SOSUS/Caesar - In the GIUK BattleSet™, the NATO SOSUS system and USSR Caesar systems may generate detections. These systems are large fields of seabed sensors laid in the North Sea to track enemy vessels through advanced passive sonar techniques. Occasionally, you may be notified of a contact using this detection method, giving you an advanced warning of a threat.

Aircraft

Aircraft are the primary scouts and a major portion of the offensive power available to today's naval forces. Effective use of aircraft is essential if you want to succeed in *Harpoon*.

Aircraft in *Harpoon* are fitted with Loadouts, which have a selection of weapons/sensors/fuel pods for a specific mission. The Loadouts are:

- Search - Aircraft assigned only to look for the enemy do not carry anything but fuel, sensors, and crew. Some of these sensors may detect other aircraft, surface shipping, or even submarines.

Ferry	- Normally has minimal or no weapons, set up for a one way trip to another base. Typically carrying external tanks full of fuel.
Tanker	- This configuration consists of many external tanks and a special attachment so other planes can draw fuel. (note: Tankers are not supported in Version 1.11 of <i>Harpoon</i> .)
Patrol	- Used for Electronic warfare and Early Warning aircraft.
Nuclear	- This loadout contains Nuclear weapons ready to do massive damage to the enemy. The type of weapon depends on aircraft type and country.
Standoff	- Cruise missiles which fly the distance from release to target without requiring guidance from the aircraft, thus reducing the risk to the launching aircraft
LR Standoff	- Same as above, but some cruise missiles (and/or AAM's) will be replaced with fuel tanks to extend your range.
AntiRadar	- A special type of weapon, normally a missile, that looks for any enemy radar that is turned on. If it hits, the radar is destroyed. If used against ships a great deal of additional damage may be caused. If the radar is turned off, most of these weapons will "go stupid" and self destruct while others home in on the last broadcasting location.
LR AntiRadar	- Same as above, but some anti-radar missiles (and/or AAM's) will be replaced with fuel tanks.
Guided	- These are "Smart Bombs" or shorter range missiles which are guided by the launching aircraft to the target. Unlike cruise missiles they have very short ranges, but can do more damage. They also cost a lot less, so a country is likely to have more of these than cruise missiles.
LR Guided	- Same as above, but some smart bombs (and/or AAM's) will be replaced with fuel tanks.
Unguided	- This loadout represents rockets, cluster bombs, fuel-air explosives and other "area" weapons. Typically, many unguided weapons are in a loadout due to their small size. These function like a grenade, spewing fragments over a wide area.

- LR Unguided - Same as above, but some of the "area" weapons (and/or AAM's) will be replaced with fuel tanks.
- IronBomb - This is what most countries used in WWII. A simple weapon that is "thrown" at or dropped on the target based on the movement of the aircraft, the wind, and temperature. These weapons are very potent (they are all explosives and metal case) but are very difficult to target effectively.
- LR IronBomb - Same as above, but some bombs (and/or AAM's) will be replaced with fuel tanks.
- AirToAir - Fighters and some better attack aircraft will load with infrared and radar guided missiles to destroy other aircraft and helicopters. Some extra fuel is carried for some aircraft types.
- LR AirToAir - If the target is far away, or the fighters must stay aloft for a long time, some missiles will be replaced with additional fuel tanks.
- AntiSub - Submerged submarines are only killed by torpedoes and depth charges. Some aircraft may be able to do this with nuclear depth charges (see Nuclear loadout).
- LR AntiSub - Same as above, but some ASW weapons will be replaced with extra fuel tanks. In the case of helicopters that cannot carry extra fuel tanks, weapons will be dropped to reduce weight and increase airborne endurance.
- AntiRunway - To destroy an enemy runway, iron bombs, guided weapons, or special "runway busting" weapons can be used. (the type used depends on the aircraft and the country which owns it)
- LRAntiRunway- Same as above, but some anti-runway ordinance (and/or AAM's) will be replaced with fuel tanks.

Most aircraft only have a limited number of possible and/or available Loadouts. All aircraft have a Ferry Loadout available, while other Loadouts are subject to both the missions which the aircraft are designed for and availability.

In the current version of *Harpoon* (Version 1.11), air-to-air refueling is not supported, though the Tanker Loadout may be present.

If you see some "extra" weapons in a loadout do not be surprised. For example, the UK Nimrod can carry torpedoes, Harpoon ASM's and Sidewinder AAM's mixed on its various loadouts.

Airborne Threat Detection

Sometimes in computer *Harpoon* a new threat which can be countered by patrolling aircraft will be detected. Instead of having to launch new aircraft or selecting a group with patrolling aircraft and splitting them off to attack the threat, we provide the Intercept Screen.

Each available unit is shown, including their current distance to the target that needs to be intercepted. Move to the Unit(s) you want to use to intercept the threat, and press the "I" key (or click your mouse on the [I]Intercept button).

Selected intercept aircraft will have a "*" show up to the left of the # of aircraft. When you have selected the units to use to intercept, select the [OK] button.

Air Intercept

TARGET: Missile Group

ID	#	Aircraft	Loadout	Range
AC03	01	F-16 Falcon	Guided	120 NM
*	AC05	01 F-16 Falcon	Guided	111 NM
*	AC05	01 F-16 Falcon	Guided	110 NM
AC04	01	F-16 Falcon	Guided	124 NM
AC01	02	Harrier II GR.5	AirToAir	160 NM
AC02	02	F-16 Falcon	Guided	125 NM

[OK]
[I]Intercept
<Cancel>

Bases

There are 3 different kinds of Bases available in *Harpoon*, and each is described below:

Airfield - An airfield.

Port - A port facility for submarines and surface craft.

Port & Airfield - A combination of both a port and an airfield.



Bases typically have various radar sensors, and defense weapons mounts that will automatically defend against attacking enemy targets. (ie. you do not have to make your bases attack using the Attack Order)

Damage & Repairs

Within *Harpoon* there is a simple Damage Point system used to represent the possible damage to Units. Each primary Unit Class in *Harpoon* has a certain number of Damage Points it can absorb before being destroyed. Each weapon can deliver a certain number of Damage Points. In addition to Damage Points, all Bases, Ship and Submarine Classes have the possibility of receiving Critical Hits. The categories of Critical Hits and which types of platforms they can apply to are shown below:

	Base	Ship	Carrier	Submarine
Weapon Mount(s)	X	X	X	X
Sensor(s)	X	X	X	X
Flooding		X	X	X
Fire	X	X	X	X
Engineering		X	X	X
Bridge/CIC		X	X	X
Rudder		X	X	X
Flight Deck/Runways	X		X	
Hanger	X		X	
Cargo		X		
Pressure Hull				X
Keel		X	X	X
Sonar		X	X	X
Aircraft	X	X	X	

Most of the Critical Hits have a chance of being repaired within 48 hours. Fire and Flooding Critical Hits are the most distressing, as either may spread and cause additional damage and critical hits, destroying the unit.

Your unit reports will show both your current Damage Points and current Critical Hits. Note that in *Harpoon* all repairs are automatic and require no input from the Side Commander. If a surface or submarine unit is severely damaged, you may want to split it off from your group into its own group.

Aircraft in *Harpoon* can only be killed, never just damaged, so they have no Damage Points or Critical Hit areas.

THE HARPOON COMPUTER INTERFACE

Using Buttons

Buttons are used on many screens within the program. Buttons can be clicked on if you have a mouse, or activated by a key. The key is always indicated on the button. So the button labeled [E]xecute is activated by the "E" key, while the button labeled [F]ull Report is activated by the "F" key. There are also two special case buttons that utilize the ENTER and ESC (escape) keys. Buttons whose entire text label is within the brackets (ie. [OK], [EXIT]) are activated with the ENTER key. Buttons within the less than and greater than keys (ie. <Cancel>, <Quit>) are activated with the ESC (escape) key. In this way we keep you from having to memorize a lot of special keys.

Using the Menus

Menus can be operated without a mouse by simply pressing the ESC (escape) key. This brings down the PC menu. Use the right and left arrow keys to move between menu headings, and the up and down arrow keys to select a particular item within the menu. Pressing the ENTER key selects the item, pressing the ESC key again cancels the menu selection mode. To operate the menus using a mouse, move the mouse pointer to the menu heading desired, then press the mouse button. Hold the mouse button down, and drag the pointer to the menu item you want, then let up on the mouse button to select the item.

Certain menu items are not always available. When a menu item is not available, then it will be "dimmed" if in EGA 640x350 mode as shown here.

PC	Game	Orders	Settings	Reports	Misc
	Attack			F1	
	Sal Group Speed			F2	
	Enter Group Course			F3	
	Formation Editor			F4	
	Ready Aircraft			F5	
	Launch Aircraft			F6	
	Join Group			F7	
	Split Group			F8	
	Sensors			F9	
	Enter Staff Note			F10	

PC	Game	Orders	Settings	Reports	Misc
		Attack		*****	
		Set Group Speed		*****	
		Enter Group Course		*****	
		Formation Editor		*****	
		Ready Aircraft		*****	
		Launch Aircraft		*****	
		Join Group		*****	
		Split Group		*****	
		Sensors		F9	
		Enter Staff Note		F10	

If you are using a graphics mode other than EGA 640x350, you will have "*****" in the menu where the keyboard alternative is normally displayed to indicate the item is disabled.

The Orders menu is always directly linked to the selected Group or Unit in the currently active window (ie. if the Group Window is active, the selected Group and if the Unit Window is active, the currently selected Unit). Note that most of the Order items do not work for Units.

Using Dialogs

Many times during the operation of the *Harpoon* program you will be presented with Dialog Boxes. To use a Dialog without a mouse, use the arrow keys to move between items within the dialog. Items within a dialog are grouped into logical "families", and to move between families, you use the up and down arrow keys. To move within a family use the left and right arrow keys. You will see either the item text or a small area next to the item highlight as you move. To select an item, use the SPACEBAR.

There are four different kinds of items in Dialogs. The first is the Radio Button item. Only one radio button item within a family can be turned on, similar to a car radios' station selection buttons. These are represented as a small circle, and if "ON" the circle is filled in. The second type of item is the Check Box item. A Check Box item is either off or on. If it is off, it is blank inside the box, and if on it will have an "X" in the box. The third type of item is a Text Edit box. You can enter either numeric and/or alphabetic text in this type of dialog item. Finally, there are buttons, as described above, normally used to accept or reject the entries you make within a dialog.

Using Scroll Boxes

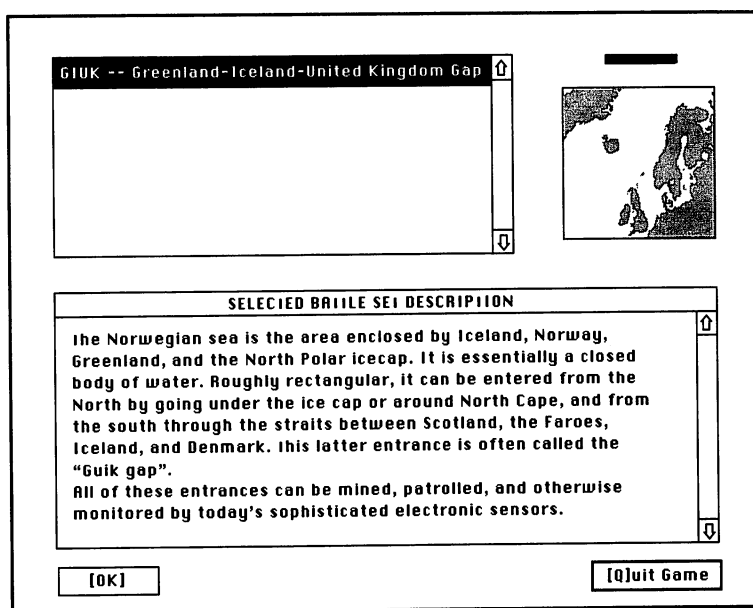
Scroll Boxes appear at various points within the program. When a Scroll Box is visible on the screen, the up and down arrow keys move the selection bar within the current Scroll Box. If more than one Scroll Box is visible on the screen, the Tab key switches between them, with the active Scroll Box having a yellow frame (a Selection Border) around it. When using a mouse, you can simply click on a text item to select it, and if two or more Scroll Boxes are visible, clicking on any item in a Scroll Box makes that the active Scroll Box.



Set-Up Screens

THE BATTLESET SELECTION SCREEN

A "BattleSet" is a series of scenarios which simulates various naval engagements in a particular part of the world. The BattleSet furnished with your original purchase simulates the fight for control of the Norwegian sea as a flanking maneuver for a Soviet invasion of Europe. This BattleSet is called "GIUK - Greenland, Iceland, United Kingdom". Other BattleSets will be made available as a separate purchase to supplement your original one. The BattleSet Selection Screen allows you to select any BattleSet you have loaded into your computer.



Once you have brought up *Harpoon* you will be presented with a BattleSet Selection Screen (see Figure 1). Use the "up" and "down" arrow keys to move the cursor to a particular BattleSet, a description of the BattleSet will appear in the accompanying box. Use the cursor to highlight the desired BattleSet, then select [OK] by pressing the **ENTER** key to bring the selected BattleSet onto the screen. To select the BattleSet furnished with *Harpoon*, simply press **ENTER**. If you decide not to play, press the "Q" key to [Q]UIT.

SELECT GAME OPTIONS SCREEN

After the Battleset has been selected, the Options screen will appear.

Use the up/down arrow keys to highlight whatever option you want to change, then use the spacebar to toggle the options. Press **ENTER** to activate [OK] when you have decided which options you will use. The following is an explanation of each option:

SELECT GAME OPTIONS	
Play Which Side?	NATO
Possible Nuclear Release?	YES
Snorkling Submarines?	YES
Realistic Weather?	YES
Normal Maintenance Failures?	YES
Start With Full Ordinance?	YES
Auto Formation Air Cover?	NO
[OK]	

If you are using a mouse, point to the different options and 'click' the left button to highlight an option. Then again click the left button to toggle that option.

PLAY WHICH SIDE? - Your options are "NATO" and "USSR". NATO is the default setting, and will allow you to control all NATO forces which are a part of the scenario you will select on the next screen. If you wish, however, you can also choose to be the Soviet admiral in charge of Soviet task forces.

POSSIBLE NUCLEAR RELEASE? - Your options are "YES" and "NO". The default setting is NO. If a scenario contains a nuclear release, this option will enable it. Some scenarios start with a "nuclear weapons free", while others may not give you release until later in the scenario. If one side uses nuclear weapons, the other side is granted immediate nuclear release. Whichever option you choose has profound implications for your tactics. For one thing, you will have to spread out the units which form your groups¹ so that they will not be vulnerable to a single nuclear weapon. However, if you do so, then you are leaving them more open to attack by submarines.

SNORKELING SUBMARINES? - Your options are "YES" and "NO". Diesel-powered submarines must take in air to run their engines. If they

¹A unit is any single platform—ship, airplane, helicopter, submarine or base. A group is a formation of units.

need to go deep, they will run on batteries. If you choose YES, then your radars and infra-red sensors may be able to detect the snorkels of diesel subs when they are snorkeling. If you choose NO, then you will only be able to detect submarines with your sonar. (NOTE: If you do choose NO, the diesel subs will act like nuclear subs and never snorkel. If your active or passive sonar detects a sub, you can give the [D]isplay command from the Reports Window to learn if it is diesel or a nuclear powered).

REALISTIC WEATHER? - Your options are "YES" and "NO". Weather can be a powerful factor in a naval engagement, especially in the Norwegian Sea which is constantly whipped by gale-force winds. In high seas your ships will not be able to travel at maximum speed. Also, the seas will prevent your surface search radars from detecting targets at the same range they normally would under calm conditions. Also, some weapons cannot be fired in sea states of 5 or greater (see description of the "Weather Report" command on the Reports Menu in Part 2). We recommend that you play the NO option until you become familiar with the game and are able to operate under full simulation.

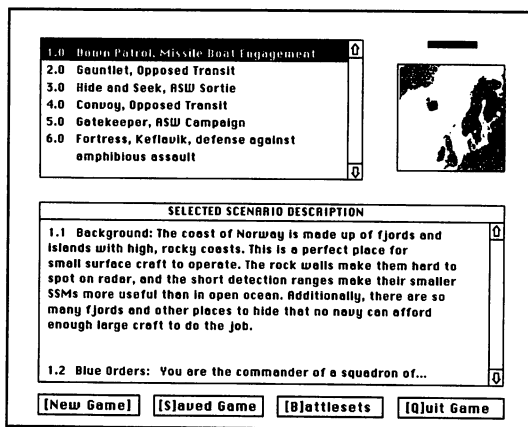
NORMAL MAINTENANCE FAILURES? - Your options are "YES" and "NO". In the real world, nothing works perfectly all the time. A modern naval vessel or aircraft is packed with electronic gear and high-tech weapons. Periodic breakdown of systems happens often. If you choose the YES option, some of your units may experience electrical and/or mechanical failures during the course of the game just as they certainly would in real warfare. Use the YES option for maximum simulation, and the NO option while you are becoming familiar with *Harpoon*.

START WITH FULL ORDINANCE? - Again, your options are "YES" and "NO". Real warfare is an exercise in logistics. That is, supplies, fuel and ammunition must be transported from the supply bases to the combat units. When war breaks out, ships must begin with whatever they have on board. Often, they are not up to full strength. If you choose the NO option, you are working under real-world conditions. A NO setting in *Harpoon* means that you have a 50% chance that your missile and/or torpedo loadout of any particular unit is 80% - 99% of full capacity. Beginners should initially start with full ammunition load-outs by selecting the YES option.

SCENARIO SELECTION

AUTO FORMATION AIR COVER? - If this option is selected, the computer staff will automatically put up AAW, AEW and ASW patrols for your groups that have this capability. If you do not select this option, you are responsible for all patrolling air asset deployment.

Once the options have been selected, the next screen to appear will be the Scenario Selection screen associated with that Battleset. The Scenario Selection Screen for GIUK allows you to choose to engage in one of twelve simulated scenarios. These scenarios generally become more difficult as you progress from the first one listed to the last.



Use the up/down arrow keys to move the cursor to the various scenarios. Text describing that scenario will appear in the box at the bottom of the screen. This text is divided into three paragraphs:

Blue Orders (or **Red Orders**, if you have elected to play the part of the Soviet commander). These orders instruct you on what you are to do to successfully accomplish your mission.

Intelligence Brief. This paragraph gives you a description of what is known about the enemy's intentions.

Background. This paragraph gives you an overview of the strategic importance of the scenario and any other pertinent background information.

Press **ENTER** to activate the [NEW] command. This will select the highlighted scenario.

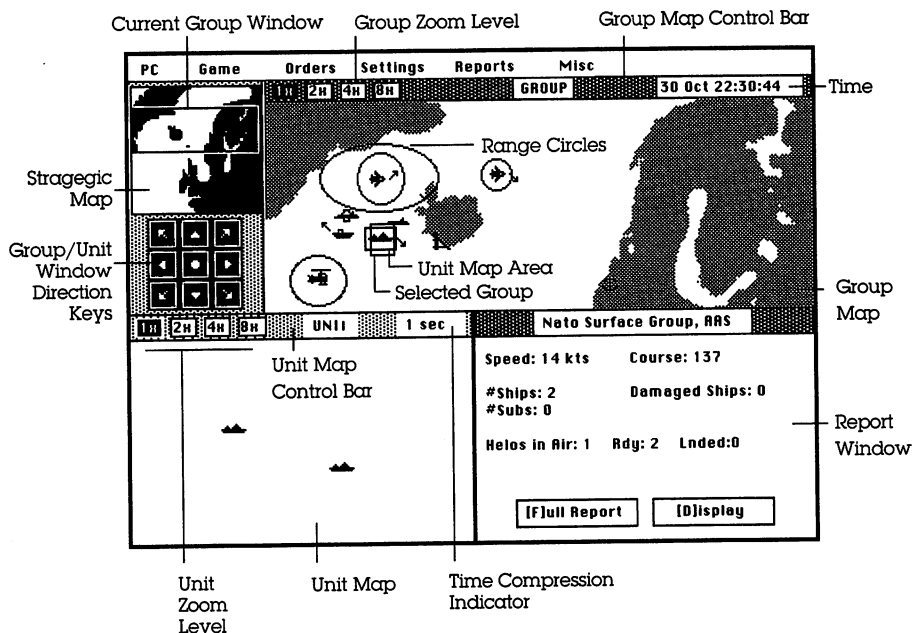


How Harpoon Works

Harpoon's interface consists of pull-down menus which are used to give commands, a main screen showing a map of the area where the battles will be fought, and various dialog boxes and report screens which will appear during the course of the contest.

THE MAIN SCREEN

The Main Screen associated with the scenario which you have selected will appear once you have activated the [NEW] command on the Scenario Selection screen. This is the arena in which *Harpoon* is played, and it is comprised of three primary areas: pull-down menus, maps and their associated control bars, and a Reports Window.



Pull-Down Menus

Across the top of the screen are six pull-down menus: PC, GAME, ORDERS, SETTINGS, REPORTS, and MISC. All orders are given using these menus, or by pressing the appropriate keys. Details of the commands contained in these menus are given in Part 2 of this manual.

Press the **ESC** key to enter the menu selection mode. Then use the "right" and "left" arrow keys to select the menus. Use the "up" and "down" arrow keys to highlight the command or function, then press **ENTER** to make your selection. Press the **ESC** key if you want to exit from the menu without activating a command.

If you are using a mouse, press the left button, drag the cursor across the menu bar and highlight the menu you want. This will cause the menu to drop down from the menu bar. Keep the button depressed, drag the cursor down the menu, and highlight your desired selection. Release the button to activate the selected command.

To the right of the menu item, you will see keyboard characters. This indicates that the menu item can be selected by pressing the indicated key(s). (See Table 2-1 for a detailed description of keyboard functions).

Maps

Note:

Refer to Table 1 for the colors associated with the items referenced in the following discussion.

There are three maps on the Main Screen, the Strategic Map, the Group Map, and the Unit Map.

The Strategic Map

The Strategic map is the small map located in the upper-left of the Main Screen. It represents the entire geographical area for the current Battleset. A rectangular box, called the Group Window, appears on this map. The area within the group window appears on the large map to the right of the Strategic Map (i.e., the Group Map, as discussed later).

Directly beneath the Strategic Map is a representation of a numeric keypad. Use the corresponding arrows on your keyboard to position the Group Window box which appears on the Strategic Window. This will allow you to view details of the enclosed area on the Group Map.

If you are using a mouse, you can simply point to an area on the strategic map, "click" the left mouse button, and the green square will center itself around the area to which you have pointed.

Also appearing on the Strategic Map (but perhaps almost too small to immediately notice) is the Unit Window. The Unit Window appears as a tiny box, or maybe even as a tiny dot, depending upon the resolution of your screen. The area surrounded by the Unit Window appears on the Unit Map (see below for information on the Unit Window).

The Group Map

The Group Map is the large map located on the upper-right of the screen. It is primarily comprised of two parts: a map showing the location of some, or all, of your groups, and the Group Map Control Bar.

1. This represents the area enclosed by the Group Window on the Strategic Window. On this map you will see symbols indicating the various groups which you will control during the scenario. When you first start a scenario, you will see a box surrounding one of your groups. The units in this group can be viewed on the Unit Map (we will talk about the Unit Map a little later).
2. The Group Map Control Bar. This is the green bar across the top of the Group Map. It is one color when the Group Map is "active" and another when the Unit Map is "active". On the left portion of the green bar are four "Zoom" boxes, marked 1X, 2X, 4X, and 8X, with the default setting being 1X. Press the "Z" key to zoom in on the Group Map, and press the "X" key to zoom out.

If you are using a mouse, point to the desired zoom setting and press the left mouse button.

To the right on the Control Bar is a date and time representation. When you begin, the time shown on this display is the Greenwich Mean Time (GMT) which corresponds to actual date and time as determined by your computer clock. (However, this "real time" can be compressed, as will be discussed later).

The Unit Map

The Unit Map is in the lower left of the Main Screen. It is also comprised of two parts.

Note:

*To make anything happen on the Unit Map, you must first "select" that map by pressing the **TAB** key. When the **TAB** key is pressed, the gray control bar will turn color (see Table 1), indicating that the Unit Map is now the "active" one. Press the **TAB** key again when you want to make the Group Map the "active" map. If you are using a mouse, all you need to do is to "click" the window you want to activate.*

1. The Unit Map. This is similar to the Group Map, but is used for close-in viewing of a specific tactical situation. Symbols appearing on this map indicate individual units, not groups.
2. The Unit Map Control Bar. This is the bar across the top of the Unit Map. Like the Group Control Bar, there are zoom setting boxes labeled 1X, 2X, 4X, and 8X. These are used to zoom in on individual units independently of the zoom setting on the Group Map Control Bar.

To the right of these zoom boxes is the Time Compression Indicator Box whose default setting is labeled "1 sec". This indicates that one second of simulation time is equivalent to one second of real time. When *Harpoon* is set to a time compression of other than real time, the number appearing in this box indicates how much simulation time passes for each second of real time. For instance, if time compression is set to "30 sec", then one second of real time equals 30 seconds of simulation time (i.e., *Harpoon* is set to operate 30 times faster than real time). Press the "Q" key to speed up time and the "W" key to slow it down. (The "+" and "-" keys have the same effect). NOTE: Game updates do not always occur each second, especially in the more complex scenarios.

The Report Window

The Report Window is located in the lower right of the Main Screen. When an item is selected from a menu, options or information related to that item will appear in the window. Also, the Report Window serves as an "animation" window. That is, when an engagement between units occurs, an animation of the unit launching its point defense weapons and missile strikes will appear. Also, you will see animations of weapons arriving on their targets.

When you initially begin *Harpoon* the Report Window will contain information on a selected group. To view information on other groups, you must first select them. To select other groups, press the spacebar to cycle the Designation Square to the next group south, and the backspace key to cycle it to the next group north. If you are using a mouse, just point to the group you want to designate, and press the left button. Along the bottom of the Reports Window are boxes for two informational choices, [F]ull Report and [D]isplay.

Current Status for NA10 Surface Group: ASW				
Speed:	12 kts	Course:	30°	
Position:	64°38' N 6°19' E			
Total Ships:	2			
Total Helos:	0			
Air Radar:	STANDBY	AAW:	0	0
Surf Radar:	STANDBY	ASuW:	0	0
Sonar:	PASSIVE	ASW:	0	0

The [F]ull Report selection allows you to get a report on the currently selected group or unit (depending on which window is active). Group reports will show up on the bottom half of the screen and are ex-

tended versions of the mini-reports normally shown in the lower right quarter of the screen. Unit reports resemble the [P]latform Display for a class of units; but it also displays the unit's current status including damage, armament loads, and sensor status.

The [D]isplay selection is the same option as the Reports menu item called Platform Display. The only difference is that if you are in the group window you will get the normal platform display selection screen, allowing you to choose between ships/subs/aircraft and all classes in the scenario or Battleset. In the Unit Window, the platform display for the current unit's class will be brought up directly.

Detailed Command Summary



This section contains detailed information on the commands used to operate *Harpoon*. These commands can be accessed by the menu bar across the top of the Main Screen. (However, we haven't given any information on the PC MENU selection, since it just allows you to view credits for the design and publication of *Harpoon*). It is not necessary to memorize each and every item since many of the selections are self-explanatory. However, you can refer to this summary if you have any questions which may arise in the course of a contest. Table 3 is a complete list of the keyboard commands which you might want to use even if you are using a mouse.

GAME MENU

This menu contains commands related to the interface between *Harpoon* and the player. It has little to do with the actual playing of the simulation itself. Commands contained in this menu are as follows:

Pause **ctl+S**

Use when you wish to pause the game in the current set-up. Press **ENTER** to [Resume] game.

New Game **alt+N**

Selecting this item will exit you from the game currently being played. CAUTION: THE GAME BEING PLAYED WILL NOT BE SAVED UNLESS YOU FIRST SELECT THE "SAVE GAME" MENU CHOICE. A dialog will appear in the Reports Window. If you want a new game, select [YES] by pressing **ENTER**. If you want to remain with the current game, press **ESC** to select <NO>. If you select [YES], you will be returned to the Battle Set Selection Screen.

Load Game **alt+L**

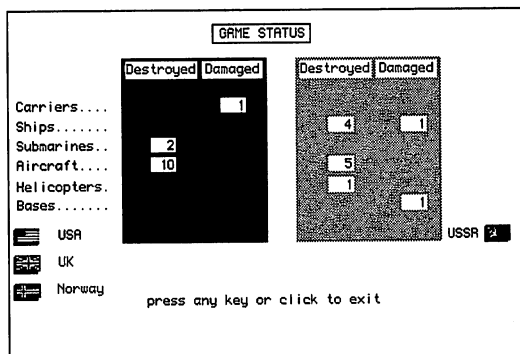
If you have saved a previous game to disk, this selection allows you to reload it and to continue play. A window will appear on the screen indicating default path and a list of files in the default directory. Use the arrow keys to move the cursor to the desired file and

Game	
Pause	ctl+S
New Game	alt+N
Load Game	alt+L
Save Game	alt+S
Game Status	alt+Q
Quit	ctl+Q

then press **ENTER** ([LOAD]) to load the game file. Pressing **ESC** will cancel the command to load a saved game. If you have saved your game on a drive other than the default drive, the [D]rive selection ("D" key) will bring up a list of the drives on your computer. Highlight the drive where you have saved your game and press **ENTER**. The screen will now show you a list of the files on that drive. Highlight the file you want to load, then select [LOAD].

Save Game alt+S

This is the opposite of the above selection; use it if you wish to continue playing the current game at a later time. If the file name you assign to the current game is the same as an existing file name, you will be asked to confirm your decision to overwrite the existing file.



Game Status alt+Q

This brings up a screen showing a status report for both BLUE and RED forces. The boxes on each side of the screen shows the losses and damage sustained by each side. Brings up a screen showing a status report for both NATO and Soviet forces.

Quit ctrl+Q

Allows player to quit the game without saving it. If you will want to play the same game at a later time, first select "SAVE GAME", and then select "QUIT". When this selection is chosen, a dialog box will appear in the Reports Window. Press **ENTER** to exit the game. Press **ESC** to cancel the Quit command.

ORDERS MENU

These commands allow you to move, attack, launch aircraft, and adjust the composition and formation of your Task Forces. Most of *Harpoon* is played from this menu, although you may execute commands directly from the keyboard if you so desire.

Orders	
Attack	
Set Group Speed	F2
Enter Group Course	F3
Formation Editor	F4
Ready Aircraft	F5
Launch Aircraft	F6
Join Group	F7
Split Group	F8
Sensors	F9
Enter Staff Note	F0

Attack F1

This command allows you to attack with whatever forces and weapons you have. It takes the currently selected Group, evaluates the weapons within your Group, then shows you a list of possible target Group(s) that you can attack.

If the Target Group contains more than one type of target you will get to

choose which type of target within the Group to attack as shown:

SELECT ENEMY TARGET

Airfield: ZXa

Submarine Group: Z2U

[OK]

<Cancel>

Attack Target Type

☐ Surface

☒ Submarine

☐ Aircraft

[OK]

<Cancel>

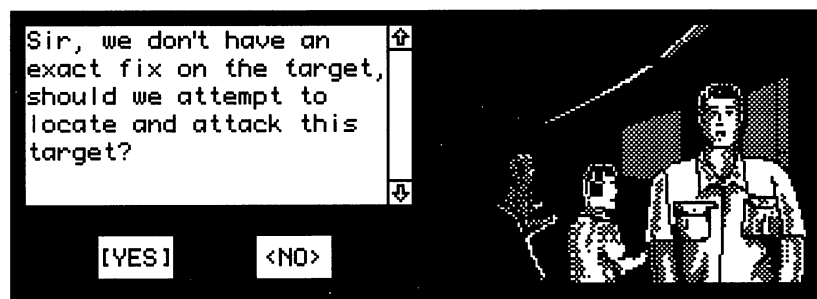
Once you select the target Group (and type) you want, one of three things will happen. If you are out of range of any of your weapons, the Staff Assistant will ask if you want to close and attack.

Sir, we are out of range. The group must close 74 NM before we are in range. Should we close and attack?

[YES]

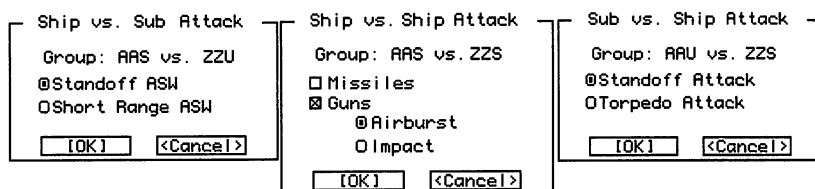
<NO>



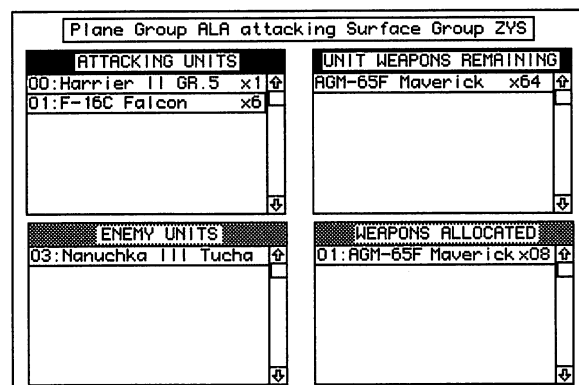


If the target has not been sufficiently localized, then the Staff will ask if you want to attempt to get a better contact, then attack.

If you are in range of any of your weapons, you will be able to select the type of weapon to use dependent on what type of group you are attacking from and what your target group is.



Once the weapons type is selected, you will be presented with the Weapons Allocation Screen.



This screen, while potentially intimidating, is also extremely versatile. This screen allows you to select which weapons from each of your units is targeted to each of the enemy group units.

Once you are close enough to the target to be within the range of your weapons, the Weapons Allocation screen will appear. The screen has four boxes:

ATTACKING UNITS - This scroll box shows a list of the units in your attacking group.

UNIT WEAPONS REMAINING - This scroll box shows the weapons each unit has at its disposal appropriate to attack the selected target. The weapons shown belong only to the unit selected within the **ATTACKING UNITS** scroll box.

ENEMY UNITS - This scroll box lists each of the enemy units in the group you are attacking.

WEAPONS ALLOCATED - When you have allocated weapons to be used against any enemy unit (see instructions, below), this box will show you the type of weapons, the number of that type, and which of your units they are being fired from, for the selected enemy unit within the **ENEMY UNITS** scroll box.

The Staff Assistant will automatically allocate weapons against most targets.

Instructions for allocating weapons against enemy units:

1. When this screen first appears, there will be a Selection Border around the **ATTACKING UNITS** scroll box. If you have more than one attacking unit, and if the Selection Border is on this box, use the up/down arrow keys to select the unit whose weapons you wish to attack with.
2. Next, press the left or right arrow (or TAB) key to place the Selection Border around the **ENEMY UNITS** box, use the up/down arrow keys to place the cursor over the unit you want to attack. If your unit has weapons which can attack this enemy unit, it will appear in the **UNIT WEAPONS REMAINING** scroll box. If this unit's weapons are already allocated or out of range it will show that information in the **WEAPONS REMAINING** scroll box.

3. Find a unit that shows weapons within your WEAPONS REMAINING scroll box, then give the [A]llocate command. Notice that one weapon appears in the WEAPONS ALLOCATED scroll box opposite the enemy unit you have chosen. Also notice that one less weapon appears in the UNIT WEAPONS REMAINING scroll box opposite the attacking unit.
4. Continue to select [A]llocate until you have allocated as many weapons as you want against that enemy unit. If you feel too many weapons are allocated, use the [D]eAllocate command.
5. Repeat steps 1-4 until you have allocated all the weapons you want to use against the various enemy units.
6. Give the [Execute] command when you have finished allocating weapons. Use the <Cancel> command if you decide not to attack the enemy.

Set Altitude & Speed F2

For Ship & Carrier Groups

For ship and carrier type groups you are only allowed to set the speed they will travel. There are 4 quick settings including:

- Stop - Used to stop your group dead in the water.
- Creep - Normally 5 knots or less, just enough speed to maintain steerage. This speed also gives maximum sonar performance.
- Cruise - This is 60% of the slowest unit's maximum speed within the group or 19 knots, whichever is less. Speeds of 20 knots or more eliminate hull sonar performance.
- Max Group - The maximum speed of the slowest unit within the group.

Set Speed

Group: AAS

Speed: kts

☐ Stop ☐ Creep

☒ Cruise ☐ Max. Group

With surface units you can also manually enter a desired speed between zero and the Max Group speed. If you enter a speed greater than the Max Group speed, it will be reduced to Max Group when you

exit the dialog via the [OK] button.

For Submarine Groups

Submarine group speeds are set in the same manner as surface groups and in addition you may set the depth you wish the group to operate at. The depths available are:

Set Depth & Speed

Group: AAU

Speed: kts

☐ Stop ☐ Creep
☒ Cruise ☐ Max. Group
☐ Surf ☐ Peri ☐ Shallow
☐ Inter ☒ Deep ☐ VDeep

- Surface - Puts your submarine group on the surface.
- Periscope - Right below the surface where you can see out your periscope and sometimes be spotted by low flying aircraft.
- Shallow - Above the thermal layer, but deeper than Periscope depth.
- Intermediate - Below the thermal layer, but shallower than the maximum safe depth for most submarines. Submarines can go up to 24 knots without cavitating at this depth.
- Deep - The maximum safe depth for most submarines, used to evade detection. Submarines can go up to 29 knots without cavitating at this depth.
- Very Deep - Can only be achieved by a few submarine classes, and eliminates all cavitation noise.

For Aircraft Groups

Like Submarines, Aircraft groups can change both their speed and altitude. Unlike Submarines and Surface units, you can only use

Set Altitude & Speed

Group: AAP

Speed: 735 kts ☐ Loiter

☐ Cruise ☒ Military ☐ Afterburn

Altitude:

☐ VLow ☐ Low ☐ Med ☒ Hi ☐ VHi

Set Altitude & Speed

Group: AAH

Speed: 185 kts ☐ Hover

☐ Cruise ☒ Military ☐ Afterburn

Altitude:

☐ VLow ☐ Low ☒ Med ☐ Hi ☐ VHi

throttle settings, not enter a specific speed.

Instead of tracking fuel in gallons or pounds, the *Harpoon* system uses an endurance measurement which equates to how long an aircraft can stay aloft without crashing. The available endurance is shown graphically using the Range Circles menu item under the

Settings menu.

The throttle settings available are:

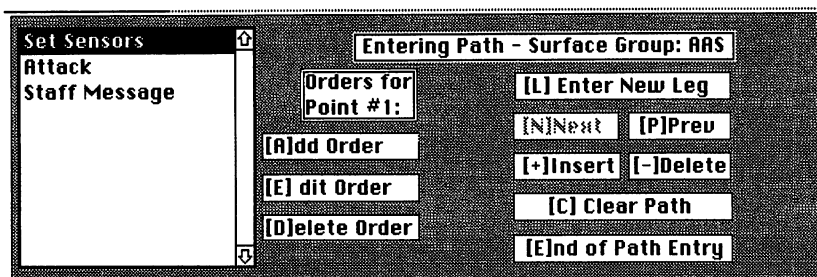
- Loiter/Hover - A Helicopter hovers in single location, while a fixed wing aircraft will fly in a tight circle at minimum speed. This increases your airborne endurance tremendously for planes, helicopters use the same endurance as cruise throttle setting while hovering. Aircraft with sonobuoys will drop them at this throttle setting and helicopters with Dipping Sonar will lower this sensor if also at Very Low altitude.
- Cruise - The most efficient speed to cover distance at.
- Full Military - This is the full rated speed of the engine without using an after burner, and top speed for those without afterburners. Endurance is reduced at a rate of 2-3 times more than the rate at Cruise throttle setting.
- Afterburner - Some high performance jet fighters have afterburners allowing them to dump fuel into the exhaust nozzle to increase speed. It reduces your airborne endurance at over 12 times the rate of Cruise speed, and should only be used in critical evasion/intercept situations.

Altitude settings available to aircraft are:

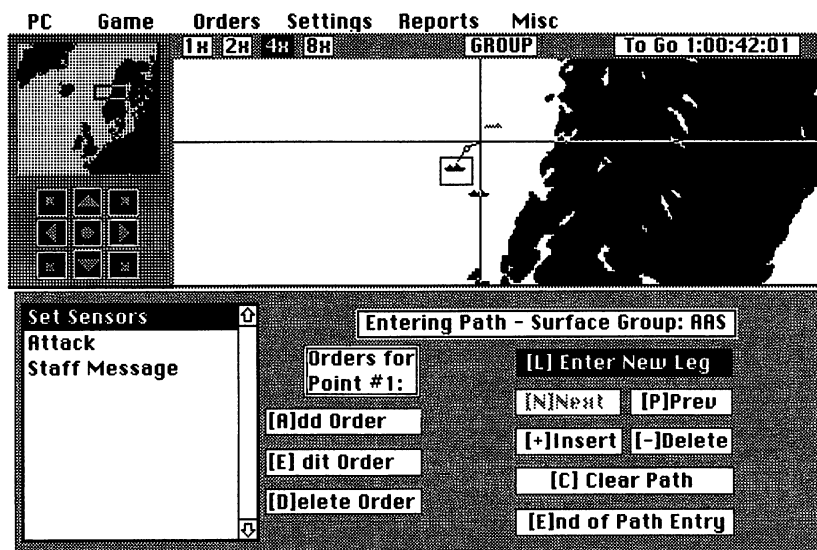
- VLow - (Very Low) This is "wave height" flying below 30 meters. If in a fixed wing aircraft, there is a significant chance that you will hit the water due to pilot error and lose aircraft, especially if you order a course change at this altitude.
- Low - Low altitude is between 30 meters and 600 meters.
- Medium - Medium altitude is between 600 meters and 3,500 meters.
- High - High altitude is between 3,500 meters and 20,000 meters.
- VHigh - Very High altitude is 20,000 meters on up. Only some jet aircraft have the capability to reach this altitude.

Enter Group Course F3

This selection brings up a window containing several different options, allowing you to set up to 48 course legs for the selected group, and at the same time, to give orders for that unit when it reaches each designated point. Commands are activated by first selecting the desired command and then entering it, either by mouse or by keyboard. Commands contained in the Enter Group Course menu choice are as follows:



[L] Enter New Leg - First press the "L" key to select this command (it is selected when the background is black and the text is white). If you are using a mouse, move the pointer to the Group map to the point





where you wish your group to travel. Press the left mouse button to enter your desired leg point. Multiple destinations can be entered for your selected group in the same manner. To leave the Enter New Leg command, simply reselect it. If you do not have a mouse, each time you press the "L" key you will get to enter one new leg point using cross hairs and the ENTER key. To cancel the leg when in the cross hair mode, press the ESC key.

[N] Next and [P] Previous - If you have entered a course with multiple legs, selecting either Next or Previous will cause the small circle on the course leg to move to either the next or to the previous leg. Use this if you want to either insert or delete a course leg, or if you want to add, edit, or delete an order at the point where the small circle is located (see following paragraphs on how this is accomplished). To use these commands, you must first de-select the Enter New Leg command.

[+] Insert and [-] Delete - Use these to either insert or to delete a course leg point. When selected, a box will appear on the screen asking you to confirm your choice. If inserting a new course leg point, press the "+" key, and a confirmation box will appear. When you select [OK], the confirmation box will disappear and the [+] Insert box will be highlighted. Then point to the area on the screen where you want your additional leg point to appear and press the left button to insert the leg.

If deleting, use the Previous or Next commands to position the circle to the leg point you want to delete. When the confirmation box appears, press the ENTER key if you want to confirm your choice. To use these commands, you must first de-select the Enter New Leg command.

[C] Clear Current Path - This command will completely clear the current path of your group, as well as any orders to be executed on these legs.

[A] Add Order - If you wish to give your group an order at the completion of a specific leg, choosing Add Order will cause the ORDERS menu to pull down. This command is only available if you do not have a mouse. If you do have a mouse, pull down the Orders Menu as you would within the game to add an order on any leg point.

[E] Edit Order - This command is available if there is an order selected within the scroll box that is editable. Some orders can only be deleted, then re-entered.

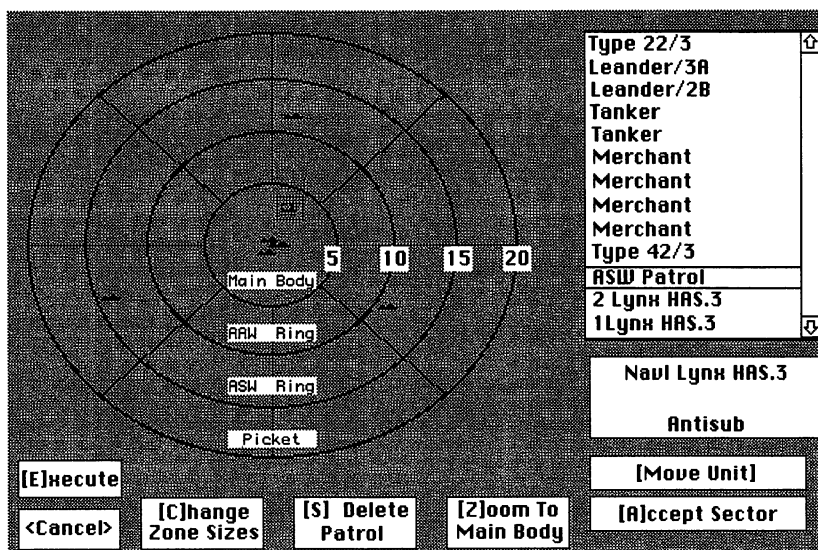
[D] Delete Order - If an order is selected within the order scroll box, you can delete it with this command.

[End of Path Entry] - Exits from the Enter Group Course Menu Selection and accepts the currently entered path and path orders.

Formation Editor F4

The Formation Editor allows you to review the disposition of the individual units within a group, and change this disposition if desired.

To start we need to review the basic concepts behind a *Harpoon* formation. *Harpoon* uses a simplified model of a surface formation, dividing your formation into 4 rings and 8 sectors. The four rings and their purpose are:



Main Body

The innermost circle of your formation, normally reserved to high value units and units with limited defenses (ie. Aircraft Carriers, Oilers, Freighters, etc...). Units within the Main Body hold their position and will have the exact course and speed of the entire Group at all times.

AAW (Anti-Air Warfare) Ring

The second innermost ring of your formation. It should be used for platforms that have the ability to engage air targets such as missiles and aircraft (ie. Aegis Missile Cruisers, Slavias, etc...). You should place them in sector(s) that correspond to the anticipated direction of an airborne threat.

ASW (Anti-Submarine Warfare) Ring

The next to outermost ring of your formation. Units placed in this ring should have ASW capabilities, so they can detect and kill any submerged threats before they penetrate into your Main Body or AAW Ring. Typical units used in this ring would include ASW Helicopters and Destroyers and Frigates with significant ASW weapons/sensors. Units within this ring will patrol within their sector(s), sprinting from place to place, then slowing down or hovering to check for sonar contacts.

Picket Ring

The outermost ring of your formation. Used to place scouting assets such that can give early warning of incoming threats. Units used for picket duty include AEW (Airborne Early Warning) aircraft and low value ships with good sensors. All units in this ring will patrol within their sector(s), speeding up and slowing down to cover it while moving with the formation.

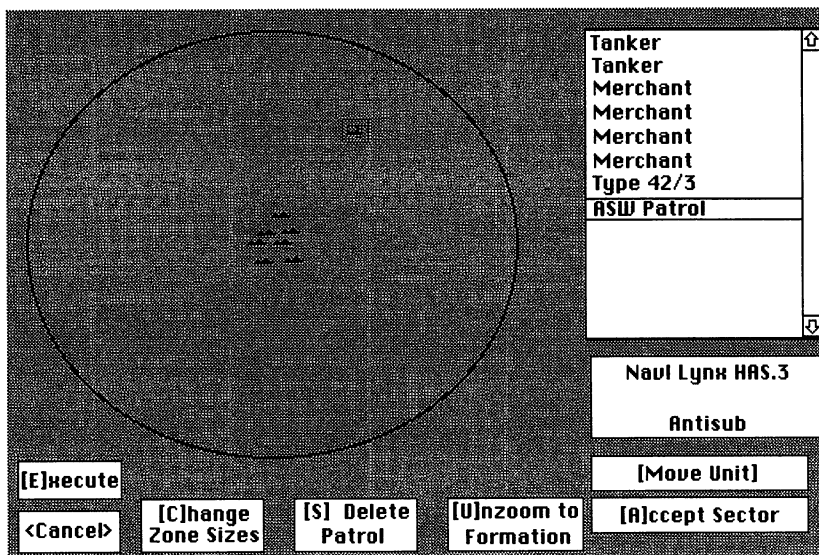
Each of the areas and buttons in the Formation Editor screen is described below:

Unit Selection Scroll Box

The box to the right of the screen lists all the ships and aircraft in your group. Use the up/down arrow keys to move the cursor square over the unit you want to position (mouse users can simply point to the desired unit and press the left button). When the cursor is placed over the name of a unit, a designation square will appear over that unit in the formation, and the sector being patrolled by that unit will be highlighted if it is not in the Main Body. A full description of the unit will appear below the Unit Selection Scroll Box.

[Z]oom To Main Body / [U]nzoom to Formation

These commands allow you to view the entire formation or just the Main Body for fine tuned repositioning.



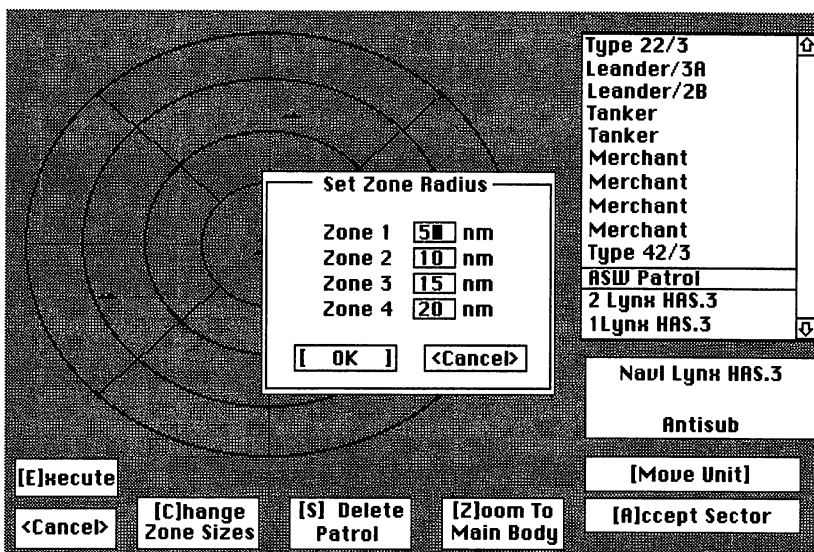
[S]et Air Patrol / [S] Delete Patrol

If you select a helicopter or plane unit, you can set it up as a an Air Patrol unit. If you select a unit that is already an Air Patrol unit, the Delete Patrol command will appear, allowing you to stop the patrol.

[C]hange Zone Sizes

This command gives you a dialog that allows you to set the radii of the four patrol zones. Each zone must be at least 1 nautical mile larger than the previous zone. The picket zone must not be more than 255 nautical miles in radius for any formation.

[Move Unit]



This button will only appear if you are running *Harpoon* without a mouse. To move a unit, select it in the Unit Selection Scroll Box, then active this button. You can now move the unit using the arrow keys. Press ENTER to accept a new location for a unit. If you have a mouse, just click on the new location you want for a unit.

[A]ccept Sector

If you want a patrolling unit to have more than one sector, move the unit then activate this button by pressing the "A" key. Do this for all sectors you want the unit to patrol, then press ENTER to finish moving

the unit. Do patrol multiple sectors with a mouse, hold down the shift key when clicking on the sectors you want the unit to patrol. If you have sufficient units, you should only designate one sector per unit to improve the quality of the patrol coverage they can provide. If you only have a limited number of patrol units, you may have them patrol multiple sectors within a ring, but since they have more area to cover, the likelihood of a threat slipping in will rise.

<Cancel>

If you select this button any changes you have made will be ignored.

[E]xecute

Selecting this button causes all your changes to the formation to be accepted. Units may take some time to reach their new formation locations, as they must keep moving with the formation while maneuvering to their new positions.

Ready Aircraft F5

This option allows you to prepare aircraft for particular mission profiles. Normally, your aircraft are readied by the Staff Assistant when they land into their default mission profile. To prepare them for particular missions, you can choose from the list of available Loadouts. When you choose this order you will be presented with this screen.

READY AIRCRAFT					
#	Type Aircraft	Loadout	Status	Time	
1	Atk Harrier II	GR.5 AirToAir	Ready	5 0	⬆
5	Atk F-16C Falcon	LR AirToAir	Ready	5 0	
6	Atk F-16C Falcon	Guided	Ready	5 0	⬇

Ammunition	Qty	Target	Range	Hit%	Damage	
AIM-9L Sidewinder	4	AIR	10.0	75	KILL	⬆
AGM 65F Maverick	12	SURF	10.0	00	27	
ALQ-131 ECM Pod	1	RADAR	HORIZ	15	NONE	⬇

[OK] [Ready] <Cancel>

READY AIRCRAFT

#	Type Aircraft	Loadout	Status	Time
1	Atk HarrierII	GR.5 AirToAir	Ready	5 0
5	Atk F-16C Falcon	LR AirToAir	Ready	5 0
6	Atk F-16C Falcon	Guided	Ready	5 0

F-16 Falcon

Available aircraft: 6

To Ready: **6**

Ammunition

AIM-9L Sidewinder	12	SURF	10.0	00	KILL
AGM 65F Maverick	12	SURF	10.0	00	27
ALQ-131 ECM Pod	1	RADAR	HORIZ	15	NONE

[OK] [Ready] <Cancel>

When you hit the [R]eady command, you will be able to select how many types of aircraft you wish to ready.

F-16C Falcon

Loadout	Range
Ferry	1481
Guided	990
LR Guided	1339
Unguided	990
LR Unguided	1339
IronBomb	990
LR IronBomb	1339
AirToAir	1339
LR AirToAir	1481
AntiRunway	990

Ammunition

	Qty	Target	Range	Hit%	Damage
AIM-9L Sidewinder	4	AIR	10.0	75	KILL
Mk20 Rockeye Cluster	4	SURF	0.0	00	25
ALQ-131 ECM Pod	1	RADAR	HORIZ	15	NONE
Drop Tank	2	N/A	N/A	N/A	N/A

[OK] <Cancel>

Once you have selected the number of aircraft to ready, the Loadout Selection screen will appear. Using this screen you can search through the available Loadouts and find one that matches the mission you need.

To select a loadout for your aircraft, use the up and down arrow keys to select the loadout you desire, then select the [OK] button.

Launch (Land) Aircraft F6 Landing Aircraft

If your group is an Air Group, you will be given a selection of locations to land which can accept your aircraft (based on runway length and endurance).

Select Group for Landing

Group	Range
Port:	ABp 99nm
Surface Group:	22U 23nm

[OK] <Cancel>

Launching Aircraft

If your group has air assets you can launch, then you will be allowed to select the mission type for the launch.

Select Destination Type

☒ Attack

☐ Ferry

☐ Patrol

[OK] <Cancel>

If you select the Attack destination, you will be presented with the Select Enemy Target selection box:

SELECT ENEMY TARGET

Airfield: ZXa

Submarine Group: Z2U

[OK] <Cancel>

If you select the Ferry destination, you will be presented with the possible landing sites to Ferrying your aircraft to.

Select Group for Landing

Group	Range
Port: ABp	99nm
Surface Group: Z2U	23nm

[OK] <Cancel>

If you select the Patrol destination one of two things will happen, depending on whether or not you have the Repeatable Patrols Staff Option set. If it is set, you will then pick a place for the patrol to go at this point. If not, you will go directly to the Launch Aircraft screen.

Once you select the type of mission for your launch and its' particular information, you will see the Launch Aircraft Selection screen.

MISSION: ATTACK Launch Aircraft

Target Range: 43nm

Fuel Range Needed: 86nm

Ready Air Assets

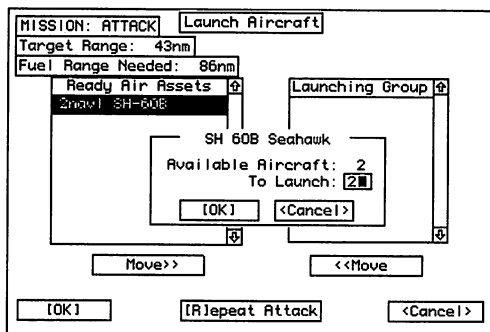
2nd Lt SH-60B

Launching Group

Move>> <<Move

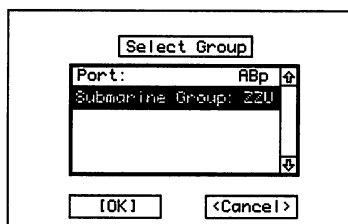
[OK] [Repeat Attack] <Cancel>

All currently readied aircraft are shown in the lefthand scrollbox. You can launch one or all as a single group by moving them to the right hand "Launching Group" scroll box.



Once you have the group you wish to launch in the "Launching Group" scroll box, then you can either launch it by selecting the [OK] button or the [R]epeat Attack button (if it is available). If you do select the [R]epeat Attack button, you will have to indicate how of-

ten to repeat the Attack or Patrol. When this command is given, a box will appear in the Reports Window listing the groups which can be joined to the group inside the Designation Square.

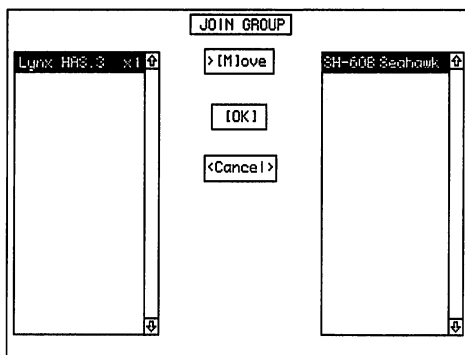


Join Group F7

Allows for joining of two separate groups into a larger one. When this command is given, a box will appear in the Reports Window listing the groups which can be joined to the group inside the Designation Square.

Use the up/down arrow keys to highlight the group(s) you want to join to your designated group, then select [OK]. A new screen will

then appear. All the units in one group will appear in one box, and all the units in the other groups will appear in the other



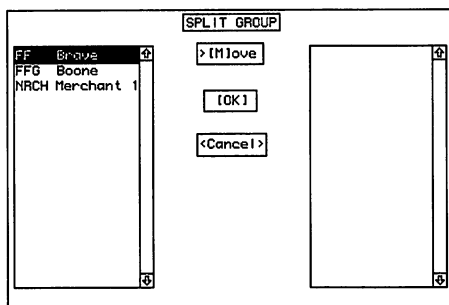
One of the two boxes will have a light colored border around it. This is the box where units can be moved from. Use the up/down arrow keys to highlight the units you

want to join with the units in the other box, then give the [M]ove command. Select [OK] when you are done to execute the join.

Split Group F8

This is the opposite of Join Group command. To split units, highlight the unit(s) to be split and press the M key ([M]ove) to move desired units from one scroll box to the other. Once you have given the [OK] command, you will return to the Main Screen.

If you want to give commands to the group you have just split off, press the SPACEBAR or the BACK-SPACE key to cycle the Designation Square to the new group. Even though the screen has not changed, you can tell that you are on the new group by its call letters. After a Split, the new group created from the units in the right scroll box will have no movement or other orders.



Sensors F9

This allows you to set sonars and radars of selected groups or units. When this command is given, the first box to appear in the Reports Window, Set Group Sensors, shows all the types of sensors you have in your designated group. Off means that no sensors are emitting. Active means that they are "on". Mixed means that sensors of units in a particular range ring have different settings, both active and off.



Set Mixed Surface Search Radars

Group: ADS

Main Body

☒ Off ☐ On ☐ Mixed ☐ Intermittent

AAW

☐ Off ☐ On ☐ Mixed ☐ Intermittent

ASW

☐ Off ☐ On ☐ Mixed ☒ Intermittent

Pickets

☐ Off ☐ On ☐ Mixed ☐ Intermittent

[OK] [Cancel]

If mixed is chosen, a series of second boxes will appear entitled Set Mixed Air Search Radars, or Set Mixed Surface Search Radars, or Set Mixed Active Sonars. The settings choices which appear in these boxes are On, Off, Mixed, and Intermittent (see next paragraph for a description of the intermittent setting)

for the Main Body, the AAW ring, the ASW ring, and the Picket Ring. ONLY THOSE RINGS HAVING SHIPS IN THEM WILL APPEAR IN DARK LETTERS, AND THE SHIPS IN A PARTICULAR RING MUST HAVE THAT PARTICULAR TYPE OF SENSOR ON BOARD FOR THE LETTERS TO BE DARK; all others will be "dimmed". Example: If you select mixed on the Set Group Sensors screen, and you only have units in the main body circle and the AAW circle, and if the main body has no air search radars, the Set Mixed Air Search Radars box will appear with only the AAW line in dark letters. After you have made your selection from this screen, the next box will be the Set Mixed Surface Search Radar screen, and only rings having more than one ship with surface search radars will appear in dark letters, and so on.

Set Intermittent Interval

Sensor: Surface Search Radar

Group: ADS/ASW

Base Period: Minutes

Variance: Minutes

Duration: Seconds

[OK] [Cancel]

The intermittent setting means that sensors can be set to periodically activate, then automatically deactivate. When intermittent is chosen, another box will appear which allows you to set the base period, the variance, and the duration of emission. The base period is the time between sensor activations. The variance

allows you to make the base period irregular, and the duration is the amount of time that the sensor is active. Example: If you set the duration at 5 minutes, the variance at 2 minutes and the duration at 30 seconds, then the sensors will turn on every 5 minutes, plus or minus 2 minutes, for 30 seconds.

Enter Staff Note F10

A box appears in which you can insert a message for the Staff Assistant to give you. Once the note is inserted, choose [OK] and a box appears asking you for the time of the event to occur. NOTE: THE TIME YOU ENTER WILL BE ELAPSED TIME (DELTA TIME), NOT ACTUAL CLOCK TIME. THAT IS, THE TIME WILL BE MEASURED FROM THE TIME THAT THE STAFF NOTE IS INSERTED.

Enter Staff Reminder Note

[OK]
<Cancel>

SETTINGS MENU

The selections on this menu do not in any way effect the playing of the game; rather, they are used to set various references and game features.

Time Compression ctrl+T

Allows for setting time compression feature. If using a mouse, just point to the time setting you want and press the left button. [Note: This feature can also be set by using the "Q" key to speed up time, and the "W" key to slow it down. ("+" and "-" have the same effect as "Q" and "W".

Settings	
Time Compression	ctrl+I
Set Range Circles	alt+R
Game Icons	alt+I
Set Grid Lines	alt+G
Game Options	alt+O
Sound Options	alt+Y
Staff Options	alt+M

Set Range Circles alt+R

The Range Circles option can be used to play *Harpoon* more effectively. Range circles show range information in a graphical format on your map views. Note the window(s) in which each range circle is active and the color they display. In general Weapon range circles are Red, Active sensor range circles are Yellow, Passive sensor range circles are Green and Airborne endurance range circles are in Blue. Range circles are centered around your Group or Unit Icon, with the icon designating the center of your Group formation in the Group Window, and the actual location of the Unit in the Unit Window.



Show Range Circles

Blue	Red	Which Circles to Show
<input type="checkbox"/>	<input type="checkbox"/>	Best Surface Missile
<input type="checkbox"/>	<input type="checkbox"/>	Best Air Missile
<input type="checkbox"/>	<input type="checkbox"/>	Best ASW Weapon
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Best Active Surface Radar
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Best Active Air Radar (all 5 Altitude Bands)
<input type="checkbox"/>	<input type="checkbox"/>	Best Active Sonar
<input type="checkbox"/>	<input type="checkbox"/>	Best Passive Sonar
<input type="checkbox"/>	<input type="checkbox"/>	total Airborne Range
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Airborne Mission Radius (minus fuel to base)

OK

<Cancel>

Group Window

Unit Window

dark red
light red
n/a

n/a
n/a
dark red

yellow
white

n/a
n/a

n/a
n/a

yellow
green

dark blue
dark blue

dark blue
dark blue

Show Game Icons

Side	Aircraft	Helo	Ship	Carrier	Sub	Missile	Corp
NATO							
USSR							
Neutral							
Unknown							

Show Icons: ☒ Stylized ☐ CDS

[OK] [+ Other] <Cancel>

Show Game Icons

Side	Aircraft	Helo	Ship	Carrier	Sub	Missile	Corp
NATO							
USSR							
Neutral							
Unknown							

Show Icons: ☐ Stylized ☒ CDS

[OK] [+ Other] <Cancel>

Game Icons alt+I

Allows for setting different styles for game icons. The default setting is "Stylized" (i.e., "civilian" symbols); the alternate style is a modified NATO CDS system. At the bottom of the screen you will see a command box marked [+ Other]. Selecting this will allow you to see icons not listed on the main Show Game Icons screen. These "other" icons cannot be altered.

Other Game Icons

Airfield		Port	
City		Nuke Area	

[OK]

Set Grid Lines alt+G

Allows for a variable display of latitude and longitude grid lines on Group Map. When selected, a box will appear in the Reports Window which shows that the grid lines are "off". If you want to turn them on, select "on", and the Latitude and Longitude Interval settings will appear with the default setting. You can change the default settings if you want. Once you give the [OK] command, the latitude and longitude lines will appear on the Group Map.

Set Map Grid Lines

☐ ON ☒ OFF

Latitude Interval:
☒ 1x ☐ 2x ☐ 5x

Longitude Interval:
☒ 1x ☐ 2x ☐ 5x ☐ 10x

[OK] <Cancel>



Game Configuration

- ☒ Enable Launch Animations
- ☒ Enable Point Defense Animations
- ☒ Enable Hit Animations
- ☒ Enable Killed Ship Pictures
- ☐ Show Game Time Remaining
- ☒ Show Current Game Clock
- Land Color @Black @Grey

[OK] <Cancel>

Game Options alt+O

This option allows user to configure which animations are to appear during game play. You can also turn on/off the Killed Ship pictures when they are sunk. You can toggle the time display on the Group Window from a time of day display to a game time remaining display. Finally, you can change the

color of the land from Black to Grey (in EGA modes), using whichever works better on your particular monitor. All these settings are saved and will be the same each time you run the game until you change them.

Sound Options alt+S

Allows user to choose whatever sound system is installed in computer. When selected, a box will appear in the Reports Window showing the default settings. If you want, you choose what sounds to have during the course of the game. If your computer has one of the sound boards listed, you can select it.

Staff Configuration

- ☐ Ignore New Ship Contacts
- ☒ Ignore Ships Running Around
- ☐ Ignore Ships Too Deep
- ☐ Ignore No Movement Orders
- ☒ Repeatable Air Patrols/Attacks
- ☐ Enable Air Intercepts

[OK] <Cancel>

Staff Options ctl+M

This option is used to enable/disable various staff reports. You may select repeatable air patrols/attacks which are useful when playing the larger scenarios. Also you can enable the Air Intercept option, which allows you to split off aircraft after each new contact.

Reports

Show Orders	ctl+O
Orders of Battle	ctl+B
Platform Display	alt+P
Weather Report	alt+W

REPORTS MENU

This menu is used as an "intelligence" source. Use it to view information you may want.

Show Orders ctl+O

Re-displays your orders which had been previously given to you in connection with the scenario you selected at the beginning of the game.

Order of Battle

ctrl+B

When this option is selected, a screen will appear which contains two boxes.

The one on the left lists all the groups at your disposal.

Use the up/down arrow

keys to highlight the vari-

ous groups. When you do

this, the box on the left will

show the units associated with that group. Use the Group [R]eport

command at the bottom of the screen to learn more about that

group. If you switch scroll boxes by using the right arrow (or TAB

key), the button will change to a Unit [R]eport and

selecting it will give you a Unit report.

NATO Groups		Unit		#Dmg	#
Port:	ABP	00:	FF Type 22/2/Broave	0	--
Surface Group:	AMS	01:	Navl Lynx HRS.3	--	1
		02:	FFG O.H. Perry/Boone	0	--
		03:	Navl SH-60B Seahawk	--	2
		04:	MACH Merchant/Mercha	0	--
		05:	Navl Lynx HRS.3	0	1

[E]xit Unit [R]eport

Platform Display

alt+P

Use this command to learn

all about the various units

at your command. When

this option is first selected,

you will be presented with

a screen containing two

boxes. The small Platform

Type box lists "Ships",

"Subs", and "Aircraft"; it will

be enclosed by a thin border. When you use the up/down arrow

keys to highlight a type, a list will appear in the large Active Classes Only scroll box.

Unit Type	Active Classes Only
Ships	Type 22/3
Subs	O.H. Perry
Aircraft	Merchant (Intl.)

[E]xit [D]isplay [S]how All Classes

Next, press the TAB key to select Active Classes Only scroll box. You can now use the arrow keys to highlight whatever class you want.

When you give the [D]isplay command, a screen will appear which gives you detailed information on that platform class.

Platform Display

Unit Type	All Unit Classes
Ships	Hawk
Subs	Oslo
Aircraft	Leander /2B
	Leander /3A
	Type 22/3
	Type 42/3
	Belknap
	Knox
	O.H. Perry
	Spruance
	Tanker (Intl.)
	Merchant (Intl.)

[E]xit [D]isplay [S]how Only Active Classes

Note:

The default setting is to list just the classes used within this scenario. For instance, if Aircraft is highlighted, only information on the aircraft classes active in this particular scenario will be shown. You can use this as a learning tool for finding out about the capability of various classes of units.

Class: FF Type 22/2

Country: UK

Length: 148 meters

Displacement: 4100 tons

Damage Points: 146

Maximum Speed: 30/30 kts

The second batch of the Broadword class, the type 22/2 is constructed with a longer hull to improve its seaworthiness and to provide room for a towed-array sonar. This dramatically improves the ship's effectiveness as an ASW platform while retaining its formidable point defense capabilities. The type 22/2 should be placed at least 30 nm (one C2) away from the noisy main group in order to avoid interference with its sensitive sonar array. It can also use its helicopters to scout for enemy surface contacts. These ships cost \$60 million each.

[E]xit [S]ensors [W]eapons [N]ext [P]revious

Across the bottom of the screen are three command boxes. If you select [S]how Only Active Classes, the large box will change to the title of "Active Classes Only", and you will be presented with just the unit classes associated with the scenario you are playing.

You can learn about these unit classes in the same manner as previously described. Select [S]how All Classes if you want to return to the default screen.

Sonar Report for FF Type 22/2

Type 2016	H	12.0	35
		10.0	
Type 2031	T	16.0	35
			70

NH 25 50 75 100 125

Passive Active Cz

[E]xit [S]hip [S]how Radar

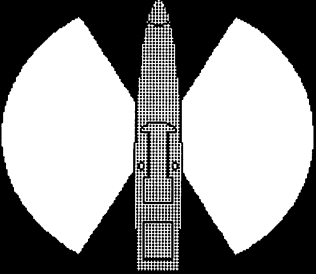
Radar Report for FF Type 22/2

Type 967/968 AS/SS	150.0
Type 1006	SS 64.0

NH 100 200 300 400 500

Target: U Small Small Large

[E]xit [S]hip [S]how Sonar



FF Brave

- 2 * GAM-801 20mm/80 Gun
1 Barrel
- 2 * Mk4 20mm/80 Gun
1 Barrel
- 2 * Mk32 324 TT
3 Tubes
- 2 * Mk7 40mm/70 Gun
1 Barrel
- Helo Pad
1 Pad
- MM38 Exocet Launcher
1 Tube

Ammunition	Qty	Target	Range	Hit %	Damage
20mm projectile	160/160	SURF/2	1.1	20	2
		AIR/2	1.1	20	KILL

[E]Hit
[S]hip
Ungroup Same Type [W]eapon

Weather Report alt+W

This command shows the weather conditions of the scenario you are playing. Most of the report is self-explanatory. The report on "Seas" will first show the height of sea swell, followed by a number for sea state. Sea state 1 means that there is virtually no "chop" to the waves, i.e., the sea is more-or-less glassy. As the wind picks up, seas will become more turbulent and the sea state number will grow larger.

Weather Report	
Group:	ZZS
Time:	30 Oct 22:40:31 GMT
Vis:	Horizon
Wind:	305 deg @ 12 kts
Seas:	6' State: 1
Depth:	2253 meters



Misc

Rename Group	ctl+R
Calc Range & Bearing	ctl+C
Staff Report	alt+A

MISC MENU

Calc Range & Bearing ctl+C

Select Group

Surface Group ZSS 0

[OK] <Cancel>

Allows range and bearing of a group or unit to be selected from a menu pick. When Selected, a box appears in the reports window listing the objects on the map (other groups, ports, airfields, etc.). Use the up/down arrow keys to highlight an object, then give the [OK] command. Another box will then appear giving the bearing and range to the object, the time to arrive there at the current speed, that the speed at which your selected group is now traveling. You can use this report to calculate new time-of- arrival if you change speed, or vice versa.

Find Range Bearing

Bearing: 090 deg

Time: 00 hr 0 m

Range: 0 nm

Speed: 14 kts

[OK] [R] Recalc

Staff Report alt+A

Staff assistant will make any appropriate recommendations for the currently selected group.

TABLE 3. OTHER KEYBOARD COMMANDS

In addition to the menu commands shown, other commands can be accessed directly from the keyboard:

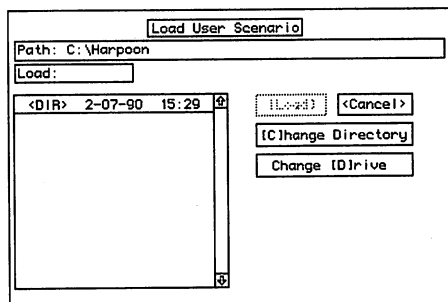
TAB key Alternates selected window between Group and Unit Window.

Arrow Keys Scrolls the currently selected window, either the Group Window or the Unit Window.

5 Key	Centers the map view in the currently selected window around the selected object. NOTE: You must use the "5" key on the numeric keypad, not the numbers across the top of your keyboard.
Z Key	Zooms in the current window (Group or Unit).
X Key	Zooms out the current Window (Group or Unit)
F Key	Gives a full Report on the selected object if a mini-report on the object is showing in the dialog box.
D Key	Brings up unit display.
Q or + Key	Compresses time by one increment each time key is pressed.
W or - Key	De-compresses time by one increment each time key is pressed.
spacebar	Selects the next object to the south (down) in the current window.
backspace	Selects the next object to the north (up)in the current window.
U Key	Selects the first Unit of the currently selected Group (in the Unit Window)
C Key	Center the Unit Window around your currently selected Group.
Enter Key	Takes you to 1:1 time compression immediately.
Alt-T	Toggle paths on/off for all friendly Groups.

TABLE 4. KEYBOARD ALT-F KEY COMMANDS

These commands are accessed by a combination of the Alt and Function keys.

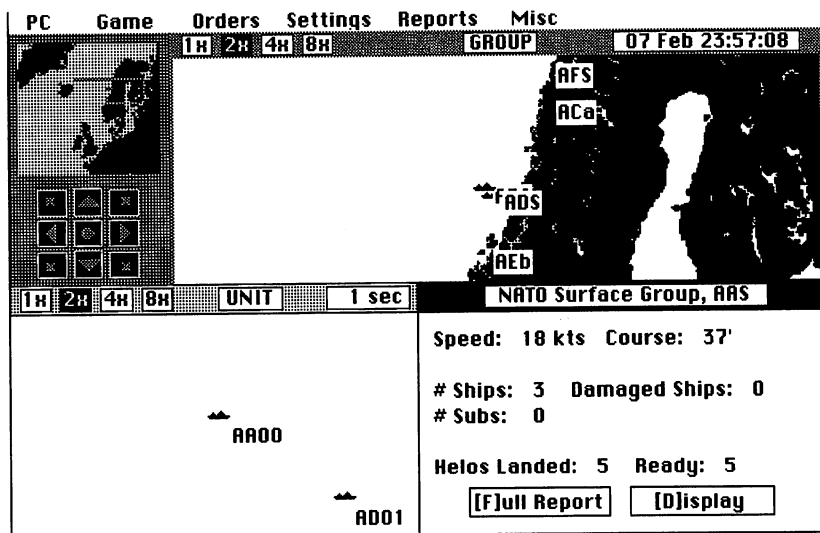


Alt-F1 (Load Scenarios from Scenario Editor)

This command allows you to load scenarios created with the Scenario Editor tool.

Alt-F2 (Toggle Group/Unit ID's)

This command allows you to toggle the Group and Unit ID's on and off, so that they show on the map views. This can be used when you have many different groups or units, and need to locate one by its' ID. Extended use is not recommended as it can clutter up your map views, obscuring information important to game play.

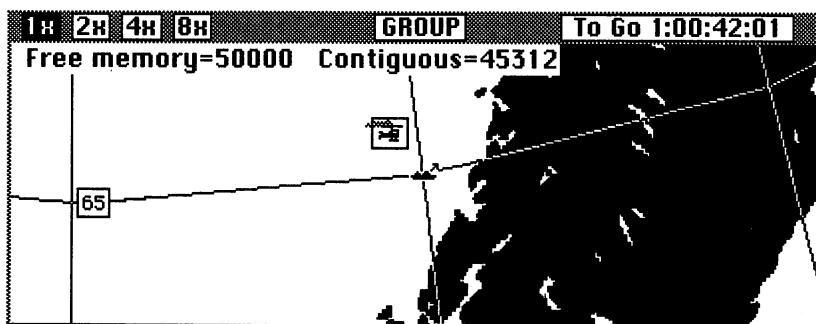


Alt-F3 (Player Nuclear Release)

This command allows you to grant yourself Nuclear Release status in any scenario, regardless of your initial Nuclear Release choice on the Options Selection screen.

Alt-F6 (Show Current Free Runtime Memory)

This command shows the memory currently unused by the game. Free memory indicates the total amount of free memory, and Contiguous indicates the largest contiguous block of free memory.



Alt-F7 (Intercept Command)

This command is activated by selecting an enemy group and hitting alt-F7. If there are any available aircraft in range with the ordinance to attack the selected group, the intercept screen will appear allowing you to allocate your available aircraft to intercept the enemy group.

Alt-F8 (Additional Staff Options)

Show Sonobuoys: This option shows all sonobuoys laid by friendly units. They are represented as white squares on the Unit Map.

—Additional Staff Settings—

☒ Show Sonobuoys

☒ Show Active Towed Arrays

Set Aircraft AAW Auto-Fire Range

☐ Never Auto-Fire

☒ 1/4 Max Range

☐ 1/2 Max Range

☐ 3/4 Max Range

Set Surface SAM Fire Rate

☐ Light ☒ Normal ☐ Heavy

[OK]
<Cancel>

Show Active Towed Array: Selecting this option will display all operating towed arrays on friendly ships and subs. The towed array is represented by a straight line coming from a ship or sub icon on the Unit Map.

Set Aircraft AAW Auto Fire Range: This option allows the user to set the range at which his units will start firing at incoming aircraft or missiles. The range indicated is based on the range of the AAW missile being fired. The default option, Never Auto Fire, will allow the computer to determine the range at which to start firing at incoming threats.

Set Surface SAM Fire Rate: This option allows the user some control over the number of SAMs his units will fire at each enemy aircraft or missile.

TABLE 5.
KEYBOARD EQUIVALENT COMMANDS

This table is a quick summary of the keyboard shortcuts.

GAME menu Commands

ctl+S	Pause Game
alt+N	New Game
alt+L	Load Game
alt+S	Save Game
alt+Q	Game Status
ctl+Q	Quit

**ORDERS Menu
Commands**

F1	Attack
F2	Set Group Speed (Set Depth and Speed)
F3	Enter Group Course
F4	Formation Editor
F5	Ready Aircraft
F6	Launch (Land) Aircraft
F7	Join Group
F8	Split Group
F9	Sensors
F10	Enter Staff Note

**SETTINGS Menu
Commands**

ctl+T	Time Compression
alt+R	Set Range Circles
alt+I	Game Icons
alt+G	Set Grid Lines
alt+O	Game Options
alt+Y	Sound Options
alt+M	Staff Options

**REPORTS Menu
Commands**

ctl+O	Show Orders
ctl+B	Order of Battle
alt+P	Platform Displays
alt+W	Weather Report

MISC Menu Commands

ctl+C	Calc Range & Bearing
ctl+A	Staff Report

Alt-F Key Commands

alt-F1	Load Scenarios From Scenario Editor
alt-F2	Toggle Group/Unit IDs
alt-F3	Player Nuclear Release
alt-F6	Show Current Free Runtime Memory
alt-F7	Intercept Command
alt-F8	Additional Staff Options



A Note on the GIUK Battleset

NATO Strategy

The Norwegian Sea is essentially an enclosed body of water bounded by Greenland, Iceland, the north polar icecap, and Norway. This somewhat rectangular area can be entered by three ways: 1) from the north by going under the polar icecap, 2) through the Denmark strait between Iceland and Cape Farewell in Greenland, 3) or through the opening between Iceland and the Faeroe Islands - the so-called GIUK gap. Because of its geography, this area would be defended against Soviet air and naval attack by task forces comprised of units from the United States, Great Britain, and Norway.

NATO forces would be attacking Soviet forces as they advanced along the Norwegian coast, pinning them down, and even putting them on the defensive. This holding action would tend to draw valuable assets needed by the Soviets on the European central front. Simultaneously, NATO nuclear attack submarines would locate and destroy any soviet nuclear ballistic missile submarines hiding in "The Bastion". If successful, these same attack submarines could also launch Tomahawk strikes against Soviet bases located on the Kola Peninsula adjoining Finland.

Soviet Strategy

From the Soviet viewpoint, their highest priority is to protect their nuclear ballistic missile submarines, keeping them secure as a "bargaining chip" for post-war negotiations.⁶ Their second priority is to defend their homeland against NATO strikes. To do this they must detect and destroy NATO units as they enter the Norwegian sea. Thirdly, they will send submarines and long-range aircraft into the North Atlantic to attack and destroy NATO convoys; for although control of this area is crucial to the Allies, requiring an immense investment in support of shipping, only a relatively small attacking force will be sufficient to wreak havoc on these convoys. Finally, they will support their Army's attacks against Norway, gaining control of the coastal seas and providing air cover for support of their own sealifts. They will probably engage in a series of "coast hopping" assaults with the idea of outflanking the defenders.

⁶The Soviets would take particular care to protect their TYPHOON class nuclear ballistic missile submarines. Each of these submarines carries twenty SSN-20 nuclear missiles, and each missile can deliver 6-9 independently-targeted warheads. By comparison, any one TYPHOON class submarine has a greater nuclear capability than most of the nuclear-capable nations of the world.

Playing This Battleset

In this Battleset you will find twelve different scenarios, each requiring you to command a different NATO unit in implementing NATO strategy. In these scenarios, you will assume command of anything from a small squadron of missile boats up to a much larger unit, including the entire strike fleet in defense of the British Isles. (If you choose to play the Soviet side, you can even control a full-scale Soviet amphibious assault force.) You will be up against the powerful Soviet Northern Fleet which is comprised of two aircraft carriers, 75 principal combatants (guided missile cruisers, frigates, destroyers, etc), 88 other combatants (ASW and AAW escort vessels), 170 submarines (including nuclear ballistic missile and attack subs, and diesel subs used primarily for coastal defense), along with over 440 naval aircraft of all types.

Fighting in the North Atlantic environment is an arduous task for even the most experienced commander. Not only will you have to engage trained and committed Soviet forces, but you must also contend with high seas, fierce winds, and thousands of miles of craggy coasts which could afford hostile forces the opportunity for surprise attacks.

You will be given orders as to your mission and strategic objectives, as well as intelligence information as to Soviet objectives and the forces you can expect to encounter. In addition you will be briefed as to the background behind your mission and its importance to the overall war effort.

The success of the European defense is in your hands. Good luck and good hunting!

A Word On The Maps Used In This Battleset

The on-screen maps used in this simulation are called "Lambert Conformal Conics". Because they have been digitally scanned from the Defense Mapping Agency Global Navigation charts GNC3 and GNC4, they are absolutely accurate in all detail. However, since the earth is a globe and not a flat plane, any map must necessarily contain distortions.

Most maps used by the public are called "Mercator Projections"; the streets maps you have in your automobile are just such things. To produce a Mercator Projection, imagine that a light is inside a globe, and a transparent cylinder is wrapped around this globe, touching it at the equator. With the light shining through the globe the images of the land masses on the globe will be projected onto the cylinder. However, notice that as distance from the equator increases, both to the north and to the south, the images of the land masses become increasingly distorted. In fact, at or near each pole the distortion is so great that the map is virtually useless. Mercator Projections are very useful in representing map data either of relatively small areas of the earth (again, as do your street maps), or areas somewhat distant from one of the poles.

Since the Battleset furnished with this module of *Harpoon* enacts situations at extreme northern latitudes, the Lambert Conformal Conic was used as the basis for the on-screen maps in order to eliminate the difficulties inherent with Mercator Projections. To understand how this type of map is produced, imagine a transparent sheet of plastic is rolled into a cone, with the tip of the cone placed directly over the north pole. Now imagine that the cone is "pushed" down so that its edges pass through the earth at 65 degrees north latitude (about where Iceland is), and exit at 35 degrees north latitude (about where North Carolina is). Shine a light through the globe and project the images of the land masses onto this cone; you now have the type of map furnished with this battleset. Although there are still distortions at extreme northern and southern latitudes, the distortion in the geographical area of where *Harpoon* is played is relatively slight.

SUPERPOWER POLITICS AND MARITIME STRATEGIES IN MODERN WARFARE

Political and Military Philosophy: The Soviet Union.

Prior to the October Revolution of 1917, power was in the hands of the Czars; today it is in the hands of the Communist Party of the Soviet Union (CPSU), especially those Party members who belong to the Politburo. Control of the Soviet military is exercised by Politburo members sitting on the Defense Council, chaired by the General Secretary of the Communist Party.⁷ Today, the only military officer sitting on this council is the Minister of Defense. He holds the military rank of "Marshall of the Soviet Union", and is its highest ranking military officer. The Defense Council is responsible for implementing all the Party's wishes with respect to national defense. The presence of the military on this council ensures that direct action is taken on its decisions.

The absence of checks, balances, civilian control, and diffused power makes the Soviet military a factor to be reckoned with in domestic and international strategic planning. However, Party control over the military establishment is solidly maintained by the KGB which has political officers assigned to monitor the behavior of individual unit commanders.

Since the Soviet Union believes in the rapid and efficient transformation from peacetime to wartime posture, all major political and military structures approximate the anticipated wartime structure, thus ensuring minimal organizational disruption. Direct leadership of war is the responsibility of the Supreme High Command (VGK), comprised of the Minister of Defense, his five commanders-in-chief⁸, plus six other deputy Defense Ministers for civil defense and other matters. In the event of hostilities, the Soviets would create Intermediate High Commands (TVDs) in the various theaters of operation subordinate to the VGK⁹. In this manner they would maintain a strong centralization

⁷Much of the information in this section is derived from Soviet Military Power, 1987.

⁸The operational commands of these officers are: (1) Strategic Rocket Forces, (2) Ground Forces, (3) Naval Forces, (4) Aerospace Forces, and (5) Air Forces.

⁹Soviet TVDS would be as follows: (1) Western TVD—Western Europe. (2) Southwestern TVD—Eastern Europe, including parts of Turkey, (3) Northwestern TVD—Northern Europe, (4) Southern TVD—the Middle East, and (5) Far East TVD—Mongolia, China, and Alaska.

of strategic planning and decentralized battle management. Moreover, subordinate Warsaw Pact members would instantly be integrated as an extension of the Soviet armed forces under a unified command structure within Western and Southwestern TVDs. The philosophy behind such an approach to war is that a unified, cohesive, well-trained force controlled by a superior command will defeat any loose coalition of forces such as NATO.

In light of the foregoing discussion, many people may consider the Soviets to be an aggressive people. But such is not the case, for the Soviet Union is not an overtly aggressive nation. Indeed, they have a healthy respect for war, having suffered staggering losses in World War II. But, like an enraged mother bear who senses a threat to her cubs, she will react violently towards any perceived threat to the Motherland.

And yet, parallel to this aspect of their national character is the fundamental tenet of Communism that the inexorable forces of history will lead to the eventual victory of the Communist system over the contradictions of Capitalism.¹⁰ To this end, they will use any covert and/or political means to assist history in reaching its foregone conclusion. In short, the Soviets believe in taking the long view. They will wait patiently for their eventual triumph since they see long-term trends as being on their side. What this means is that they will only use military force when they think they are backed into a corner. When they do attack it will probably be because they see no other solution to their problem, and because they see the safety of their nation at stake. Strategically, they will fight a defensive war, one designed to remove some threat to the Soviet Union.

Soviet Maritime Strategy

This "scientific" view of history which is so peculiar to Communism also carries over into their military doctrine. The Soviet definition of military doctrine states that it is based on a "system of scientifically founded views". This theme of science is a constant throughout all aspects of the Soviet military. When a Soviet officer must decide how

¹⁰Contrary to popular perception, glasnost has not changed the fundamental character of communism. What we are witnessing is an attempt by the Soviet government to improve its economic posture by incorporating some of the tenets of a market-based economy. By and large, their contempt for (and, frankly, fear of) western style democracy is largely unchanged.

many aircraft to use in attacking a target, he uses a formula. When a Red Army lieutenant is asked how to act in a specific tactical situation, there is only one correct solution, just as there is only one correct answer to a mathematical equation.

Soviet doctrine is based on both a combination of political and economic inputs from their leadership and on Military Science (the scientific "physics" of war). Based on these two sources they have developed the Military Art: the theory and practice of war in a specific time and place. From this formidable body of work, the Soviets have developed a list of missions to be performed by their Navy in war-time. In order of priority, they are:

- Operations Against the Land (Strategic Strike)
- Anti-Naval Nuclear Forces (Anti-SSBN)
- Protection of their SSBNs (Pro-SSBN)
- Anti-Surface Lines of Communication (Anti-Convoy)
- Protection of their own lines of Communications
- Support of the Army

When compared with an equivalent list of US missions, there are many differences. The US does not prioritize its missions, except to place primary emphasis on Deterrence. Soviet missions are more carefully and completely defined. But this attention to detail and structure could be a two-edged sword: on one hand, Soviet forces have clear guidance as to their charter and their objectives; on the other hand, this system is less flexible than the Western system, imposing greater restriction on Soviet forces and allowing for less strategic and tactical creativity.

Strategic Strike

Since the Soviet Union bases its military strategy on the land, this is also called "Operations Against the Land". These missions would be executed by Delta and Typhoon class nuclear ballistic missile submarines (SSBN) firing from protected areas in the Barents and Kola Seas, and from under the Polar icecap. Older Yankee-class boats would have to fire from positions off the Coasts of the United States. Today, the very newest Soviet attack submarines (SSN) also have a strategic strike capability as do American attack subs. However, unlike

American submarines which can launch either nuclear or conventional cruise missiles, Soviets submarines fire only the nuclear SS-N-21. These subs are so valuable for other roles that their participation in a nuclear strike is unlikely.

Anti-Naval Nuclear Forces

Since World War II, the Soviet Union has viewed the nuclear strike capability of first the US, then other navies, as the primary naval threat to the Soviet State. These threats would come from American carrier-based strike aircraft, nuclear ballistic missile Subs (SSBN), and (most recently) from cruise missiles capable of being launched from a variety of platforms. Defense of the Motherland against nuclear strike is not the responsibility of the Navy, alone: the air defense force has its role to play in the event that missiles are launched. However, the role of the Navy is to track and attack potential launch platforms as they approach within firing range. In actual wartime, they would immediately attempt to destroy such platforms.

Protection of Their SSBNs

To protect their own nuclear strike force, the Soviet Navy will probably form "bastions" in the Barents and Kola seas, even stationing ballistic missile subs under the polar icecaps. A bastion consists of an area of water, partially enclosed by friendly shoreline, cordoned off by mines. Surface, submarine, and aircraft forces will patrol inside and outside this area. Acoustic sensors in the seabed will help detect hostile submarines. In the event that Soviet SSBNs are required to leave their bastion, they will be escorted by the newest and best attack submarines. Where there is no ice, patrol aircraft and helicopters will continuously patrol overhead. The most capable ASW ships will form hunter-killer groups. Hence, a major part of the Soviet Navy will be organized with the one goal of preserving the land-attack capability of the Soviet naval forces.

Attacking Enemy Lines of Communications (Anti-Convoy)

Once the Soviets secure their own ability to strike the enemy's homeland and reduce its ability to strike their own country, they will use their remaining forces to attack the enemy's strategic and tactical supply lines which would normally consist of large naval convoys and other merchant traffic. Given the fact that none of the NATO allies are economically, strategically, or militarily self-sufficient, this action would be aimed at strangling the NATO war effort on land. To

accomplish this task, the Soviet Navy would have to leave home waters and even go beyond the Norwegian Sea, using submarines and long-range strike aircraft. Mines would be laid in shallow waters near enemy ports, and the ports themselves might be attacked by air strikes and/or commando teams with sabotage responsibilities.

Support of the Army

The lowest-priority mission defined by the Soviet strategists is supporting the Army. This would be performed by amphibious forces and small combatants. Small landings would be made to outflank the enemy. Supply cargo would be carried in the waters off friendly coasts, escorted by naval warships.

Political and Military Philosophy: The United States and Her Allies

To understand the thinking behind Western military philosophy and strategy it must be remembered that the United States and her allies represent the greatest coalition of economic powers ever witnessed in world history. Within this consortium of power, no nation is as economically self-sufficient to the same degree as is the Soviet Union. Instead, the stability and well-being of the West is dependent upon an unimaginably complex web of financial and trade arrangements designed to allow each nation a maximum economic benefit consistent with the overall health of the other members of this trading society. Within this system, the economy of any one major nation is largely dependent upon the state of the economy of any other major nation. Because of this, the capitalistic societies have come to realize that no one nation can pursue a policy too detrimental to the well-being of any other nation. Should the economy of any one of the major trading partners collapse, the repercussions will be severely felt throughout the entire Free World.

Western politics tends to be strategically less long-range than do Soviet politics, focusing more on the immediate state of the economies of member nations. But because of this world-wide economic arrangement, Western military planners have developed strategies built around the rapid deployment of forces to sensitive areas, with the goal to protect the vital arteries which sustain the health of allied powers. So whereas the Soviets would view control of the seas as a means of both protecting the Motherland and isolating land-based battles from allied support, the US and her allies view sea power as a

vital necessity towards allowing the free flow of both economic and wartime materials.

Because of the nature of Western economic arrangements, American political and military philosophy with regards to communist countries is one of "containment", i.e., preserving the *status quo* by erecting a series of alliances with countries inside our sphere of influence. Of these alliances, the best-known, most powerful, and most crucial to the defense of worldwide democracy is the North Atlantic Treaty Organization (NATO).

By comparison to the relatively simple, straightforward, and somewhat streamlined peacetime military organization of the Soviet Union, that of the United States would appear absolutely muddled. And in many respects it is. Yet just as political ideologies and national self-perceptions have given rise to the Soviet military organization, so too has historical Western ideologies and concerns shaped our own political-military system.

The United States has traditionally avoided a centralized "General Staff" concept in its military organization. In one respect, this concern originated with the framers of the Constitution who realized that the British general Oliver Cromwell had established a military dictatorship that had almost throttled democracy in its infancy. In part, also, is the concern over the establishment of a general staff which would operate as a "state within a state" as did the German General Staff in World Wars I and II.¹¹ As a result, control over the American military is diffused through a vast interlocking and complex bureaucracy of civilian agencies and military commands administered under civilian control through the Department of Defense. From the perspective of Western ideologies concerning the inviolability of personal and social freedoms this concept is almost sacrosanct. There are, however, both organizational and economic prices to be paid for this concept: an economically wasteful lack of cohesiveness in military planning and procurement, unclear and uncoordinated objectives among the three armed services (Army, Navy, and Air Force), and a burgeoning military-civilian bureaucracy which consumes tax dollars at a formidable rate.

¹¹The Modern US War Machine, Ray Bonds, editor (New York: Crown Publishers, Inc.) 1987, p.31.

With regards to the administration of our military treaties, much the same ideology applies. Each member country is responsible for maintaining a military presence consistent with its national interests. In the event of a worldwide conflict, each nation would be faced with the dilemma of how best to contribute its military resources in defense of the common cause against the protection of its own borders and its own population. For example, in the event of a Soviet incursion into West Germany, our British allies would have to decide between committing their troops to that front, or protecting their own soil against a simultaneous Soviet threat.

Moreover, in the event of a large-scale conflict, the Western philosophy calls for a coalition between the armed services of each country, with strategic and tactical responsibility for the execution of the war falling upon military representatives from each member country acting in concert. But while the difficulties inherent in a system lacking a strong monolithic command structure are obvious, there is also one very important strength. Once the fundamental strategy has been established, each military commander has great latitude on how best to execute his responsibilities. This concept of individual responsibility for decisions reaches down even to platoon and squad level. This strength of the democratic tradition renders a war effort less prone to debilitation should key individuals or units within the command structure be killed or otherwise removed from action.

American Maritime Strategy

America's Maritime Strategy is a part of its overall National Military Strategy. National Military Strategy is built around the tripartite concepts of: 1) deterrence and transition to war, 2) seizing the initiative, and 3) carrying the fight to the enemy.

Deterrence and Transition to War

Deterrence, both nuclear and conventional, is designed to limit Soviet options and to convince them that any military solution to a crisis will fail. The concept of nuclear deterrence, the so-called "balance of terror", is familiar to everyone. Less well-understood is that of conventional deterrence. Under this concept, the US and her allies will place naval and land units in or near crisis situations, altering the balance of forces so that the chance of a hostile military solution to the crises is

lessened. Of course, the opponent may see these forces as something to be matched, so the amount and nature of the force is critical. However, a key factor in this philosophy is the fact that the Soviets and her Warsaw Pact allies enjoy a considerable advantage in the size of their conventional forces. In most scenarios it is assumed that the Soviets will enjoy a numerical superiority in the event of a full-scale conventional conflict. Therefore, for a Western conventional deterrence to be effective the Soviets must be made to realize that superiority by virtue of numbers is illusory. Critical to this strategy is: a) superior NATO firepower resulting from technologically superior weapons systems, b) surrendering large tracts of territory in order to gain both maneuvering rooms for counterattack and to gain time in bringing our industrial superiority to bear, and c) superior mobility in placing both regular and reserve forces into theaters of crisis situations and in reinforcing the front with our industrial output.

Seizing the Initiative

If deterrence fails the Soviets will probably make the first move. Since NATO is a coalition, the Soviets have the initiative as a single player. Having the initiative is vital in a military campaign because the force with the initiative will get his enemy to react to his actions, and will be able to choose the time and place for engagement. The US, therefore, must seize the initiative and turn the battle to her favor.

The Allies will first try to counter the enemy's initial attack, causing them to stall and to lose the timing of their pre-planned campaigns. The Allies may also attempt to disrupt the Soviet's "scientific" approach to campaigns by launching attacks or maneuvers designed to force the Soviets to react to unanticipated threats. In this stage of conflict, the line between NATO offensive and defensive actions may be blurred. For instance, an apparently offensive strike against airfields on the Kola Peninsula may, in fact, be designed to protect convoys from attacks by land-based bombers. "Seizing the Initiative", then, refers to changing from a defensive posture to an offensive one. The amount of time this may take to happen will vary with the situation, but it has to happen.

Power Projection

Once NATO has the initiative it will try to turn the tide of battle and carry the fight to the enemy. This is what the Navy means by "Power

Projection", and it entails moving into the adversary's home waters and attacking him there so that his forces will have to be used to defend his own territory. Tasks to be performed might include recapturing conquered territory, clearing the seas of submarines so that ships can move through it, or eliminating enemy air capability by striking at enemy bases. If the Navy is able to project its power, the US and her allies should have the upper hand. Yet this might also be the most critical part of the war. Hopefully, of course, the enemy will sue for peace at this point, realizing that his military and political goals are now impractical or unobtainable. But, on the other hand, we cannot press a nuclear opponent too closely. If he thinks that his national survival is at stake he might use strategic nuclear weapons, or threaten their use, in order to gain better terms. The risk of nuclear weapons being used is present throughout modern conventional war; but the real danger of their being used will most likely occur if one side feels that it is losing, or has lost.

US Navy Organization

The US Navy engages in the projection of power all over the globe in support of American policy and goals. It maintains bases in, and has ships on, virtually every ocean in world. For command and control purposes, Naval forces are divided into numbered fleets, each with their own geographic responsibilities: Second Fleet (Atlantic), Third Fleet (Pacific), Sixth Fleet (Mediterranean), and Seventh Fleet (Far East). Within each Fleet, units are organized into "Task Forces", i.e., groups of ships chartered to perform specific tasks such as convoy escort, amphibious landing and support, strikes against enemy bases, etc. Because some tasks are constantly being undertaken, planners simplify matters by using several standard task force organizations.

Carrier Battle Groups (CVBG)

The first and most important type of task force is the Carrier Battle Group. Centered on a single aircraft carrier (CV), the CVBG includes two or three guided missile cruisers (CG) for long-range air defense, a few guided missile destroyers (DDG) for close-in air defense, two destroyers (DD) or Frigates (FF) for anti-submarine defense, and a few submarines patrolling in front of the task force which are used for both offensive and defensive purposes. The CVBG may also include support ships and auxiliaries to support the task force with fuel, ammunition and stores. A carrier battle group has an impressive array of firepower. It can attack surface targets with strike aircraft, missiles

from the escorts, or torpedoes from the submarines. It can attack hostile submarines with ASW helicopters, its own subs, or ASW weapons from escort ships. It can destroy incoming aircraft with either its own fighters or surface-to-air missiles (SAM). It can also strike enemy shore bases either with aircraft or with long-range cruise missiles. The American CVBG is the most flexible and powerful combination of naval forces that exists.

The navy also uses light carrier battle groups centered on a VTOL (vertical take-off and landing) or helicopter carrier. Although these battle groups are quite inferior to the CVBG in terms of overall firepower, they are invaluable for ASW, escort, or support roles.

Surface Action Groups (SAG)

A Surface action group is centered on one or more powerful surface ships such as cruisers and/or battleships, and includes several escort ships for protection. Its mission is to provide heavy firepower when needed, as in support of an amphibious landing. A SAG would also use missiles (or guns, in rare instances) to attack hostile surface units. But since the Soviet Navy does not usually deploy its surface ships in distant waters, the chances of a SAG being used in this role is somewhat limited.

REVIEW OF MODERN WEAPONRY— THE IMPACT OF TECHNOLOGY

Technology is the driving force behind modern naval warfare, much more so than warfare on land. On land, there have certainly been technological improvements in such systems as tanks, troop carriers, helicopters, artillery and explosives, visual detection systems and the like. Nevertheless, the dominant force on land continues to be the individual infantry soldier; technology has not changed this fact. At sea, however, the development of new weapons and sensors has had a dramatic effect. Modern naval warfare fundamentally involves machines fighting other machines, with humans directing them and serving as parts of the machines, performing tasks that electronic subsystems are not yet capable of doing. Ever since war at sea became mechanized, the goal has been to remove humans from the loop and to maximize speed and efficiency. The effect has been to improve reaction time and, simultaneously, to reduce manpower support overhead. The ultimate example, to date, is the Aegis anti-air

warfare system: under human direction it detects, classifies, and engages hostile aircraft without human intervention. Advanced technology makes this system possible, but it also increases the burden on the person ultimately responsible - the naval commander.

Search and Detection Systems

Before an enemy can be engaged and destroyed he must first be detected. If he cannot be detected, located, and tracked no amount of firepower will be to any avail.

Modern detection and military intelligence capability commences with reconnaissance satellites orbiting the earth at a distance of 150 miles or further. These "spy-in-the-sky" systems can monitor the movement of enemy troops and materials in and out of port, as well as the location of hostile naval task forces at any point on the globe. Although they currently would play little part in an actual tactical engagement, their information is invaluable to military commanders in determining enemy positions and strengths. The capability of technological nations to exploit outer space is currently giving rise to a new phenomenon: space warfare. In order to deny an enemy access to intelligence data derived from spy satellites, we are now witnessing the advent of anti-satellite weapons such as killer-satellites (orbiting satellites whose sole purpose is to destroy an enemy's reconnaissance satellites) and anti-satellite missiles.

At the tactical level, enemy forces are located, tracked, and identified by a variety of sophisticated sensors. Air search radars can detect and track aircraft at ranges of more than 200 miles, while surface search radars perform similar tasks on targets over forty miles away. Passive electronic listening systems receive and analyze the various enemy radar emissions, allowing naval commanders to precisely classify what kinds of ships, aircraft, and other weapons systems he will be encountering. In fact, since receivers can detect emissions at distances far beyond radar range, task force commanders can know the composition of their adversaries long before they are detected and tracked by radar. Information from active and passive devices is fed into computers where it is analyzed, with the results displayed on consoles. In fact, the state of the art is such that all information being obtained by one naval unit can be networked to other units so that any one ship has access to the same information as any other ship.

But as important as it is to know the composition and the whereabouts of the enemy, it is equally important to deny him access to similar information. As a result, modern naval units employ a variety of systems designed to jam and/or deceive enemy radars. Such systems run the gamut from simple chaff (strips of aluminum foil cut to lengths effective against specific electro-magnetic wavelengths), to electromagnetic jamming beams tuned to the specific frequencies of enemy radars, to systems designed to confuse enemy commanders by producing phantom or misleading electronic targets.

All that has been said about surface detection systems can also be said about subsurface systems. Sonar is to undersea warfare as radar is to surface warfare, with the difference being that sonar operates on the principle of reflected sound waves, as opposed to reflected electromagnetic waves. All submarines and surface combatants have onboard sonar systems which are used for precise target tracking and torpedo fire control. Some systems are integral to the ship itself, and some are towed behind the ship to reduce the effects of ship noise on sonar reception. In addition to these active devices, submarines are equipped with long-range passive listening devices. These systems are capable of alerting submarine captains to the presence of enemy subs at distances far beyond sonar range. By being passive they also have the advantage of not alerting the enemy to one's presence. Their only disadvantage is that they cannot track a target as precisely as can active sonar.

Anti-submarine helicopters use sonar devices which are dipped into the water from the hovering platform, as well as sonobuoys (expendable sonar devices dropped into the vicinity of where a submarine is suspected of being). Anti-submarine fixed-wing aircraft also employ sonobuoys as well as Magnetic Anomaly Detection (MAD), a system which is capable of sensing disturbances in the earth's magnetic field caused by the presence of a large metallic object, such as a submarine.

Air and Anti-Air Weaponry

It is an axiom of warfare that the force which controls the high ground controls the battle. Beginning with World War II, winning the high ground has meant control of the skies. In the early 1940's, of course, controlling the skies meant controlling the airspace in the

immediate vicinity of a task force. Today, however, advances in both aircraft design and in guided missile capability have expanded the threat envelope to ranges of hundreds of miles from the fleet.

Control of the skies (and hence, control of the seas) is a function of guided missile technology. Fundamentally, there are three types of guided missiles: Surface-to-surface missiles (SSM), surface-to-air missiles (SAM), and air-to-air missiles (AAM). Tactical missiles are normally guided to their targets by one or more types of guidance systems: inertial navigation, active homing, semi-active homing, or passive homing. (A fifth type of missile, the beam rider, has been phased out of active use).

Inertial navigation is primarily employed in SSMs, and means that the precise geographic location of both the launch platform and the target are fed into a computer on board the missile. Based on this information the computer programs the missile's flight to the target. Of course, in naval warfare the target is in motion and cannot be expected to be in the same location as it was when the missile was launched. Consequently, anti-ship missiles employing inertial navigation often have a second type of guidance system (normally active homing, as described below) which takes over once the missile approaches within a specified distance of the target. The Harpoon missile is an example of a SSM employing both inertial navigation and active homing guidance systems, as is the hypermodern AMRAAM (Advanced Medium Range Air-to-Air Missile).

Active homing means that the missile itself radiates a coded radar beam, called an "illumination" beam. The beam is coded so that the missile can recognize its own beam from all the other radar beams that will exist in an hostile environment. When this signal is reflected from the target, the missile receives it, processes the signal for target location and predicted intercept point, then guides the missile to the target. The advantage of active homing is its "fire and forget" capability, i.e., once the missile has been launched the platform can turn its attention to other threats. The disadvantage is that target destruction information may not be available except by search radar. Active homing systems are also complex and costly.

Semi-active homing is similar in concept, except that the target is illuminated by a coded beam originating from the launch platform. Systems called Fire Control Directors radiate both a target tracking beam and a separate illumination beam electronically aligned to the axis of the tracking beam. Once the fire control director "locks on" with its tracking beam the missile is fired and uses the information received from the encoded illumination beam to process an intercept course. Because the target is being continuously tracked by the highly-precise tracking beam, target destruction information can be immediately obtained. The disadvantage is that the fire control director must be occupied with a single target until intercept occurs; otherwise, the missile will have no target illumination information. Most SAMs and AAMs currently use semi-active homing systems, with the most notable shipboard missile being the Standard RIM-66/67 and the most notable air-launched missile being the Sparrow AIM-7.

Passive homing means that neither the missile nor the launch platform radiate a guidance beam. Instead, the missile homes in on specific radiation emitted from the target itself. Some missiles (such as the fabulously successful Sidewinder AIM-9) will home in on a source of intense heat, such as a jet engine's exhaust. Others, such as the Standard ARM (anti-radar missile), will home on any radar beam emitted by the target. Passive homing missiles generally have the advantage of simplicity and low cost, combined with a high degree of effectiveness. However, they are usually of much shorter range than their semi-active counterparts, usually in the 15+ mile neighborhood.

Many guided missiles have back-up systems to increase their chance of intercept should the target employ some sort of defensive countermeasure. Active and semi-active homing missiles often have a "home-on-jam" capability which is automatically activated should the target attempt to jam their illumination beams. Anti-radar missiles are designed to continue their flight to the last predicted intercept point if the enemy should turn off his radar; this can be fairly effective against slow-moving ships or stationary ground radars. And heat-seeking missiles, which formerly could be foiled by aircraft dropping flares, are now designed to ignore such spurious heat sources. Despite all the advantages of guided missiles, they are still ineffective against targets that are very close (inside one mile). Because of this fact, and because of the threat of low-flying cruise missile which might not be detected until impact is immanent, modern gun sys-

terms such as the 20-mm Phalanx Mk 15 & 16 have been developed. Comprised of a fire control radar and a six-barreled "Gatling gun", over 400 of these self-contained units have been installed on over 125 US ships. Many further supplied to foreign buyers. This "last ditch" defense system has been proven effective against the French Exocet missile in live firing tests.

Underseas Warfare Systems

There are fundamentally only two major types of anti-submarine weapons: depth charges (conventional explosive and nuclear) and torpedoes (including rocket-boosted stand-off models).

The conventional depth charge, of course, was the old stand-by of World War II. Today, because of technological advances which have led to the increased reliability of torpedoes, the conventional depth charge generally plays a less important role than it did in the past. It sees greatest use in the navies of Europe and Asia, and is also used by the U.S. Navy when attacking targets in shallow water.

Western arsenals contain nuclear depth charges in yields ranging from 1.5 - 15 kilotons. These weapons can be rocket-launched from submarines or surface vessels, or they can be dropped by aircraft. The danger, of course, in employing such weapons is the risk of further nuclear escalation. Therefore, for all practical purposes, any conventional underseas conflict would be fought using torpedoes with conventional warheads.

In many respects, modern torpedoes are like guided missiles adapted to an underseas environment, but instead of rocket motors, torpedoes are driven by propellers turned by steam, gas generators, or electric motors. Like missiles, torpedoes have various types of homing or guidance systems; or they can be free-running. However, the most effective ones incorporate self-contained guidance. Active homing systems are common; but unlike missiles which home on reflected electromagnetic energy, torpedoes utilize on-board sonar to detect and lock-on targets. Many also incorporate either a passive homing system whereby the target is tracked by the noise it makes, or they use a wire-guidance system where data from shipboard sonar computers feeds target information to the torpedo by a thin wire trailing behind it. Most torpedoes utilize a combination of either passive homing or wire guidance, along with active homing.



Bastion

Any heavily-defended area of water. Normally, a bastion includes water partially enclosed by friendly shoreline, and cordoned off by mines. Surface, submarine, and aircraft forces would patrol inside and outside this area, and acoustic sensors in the seabed would help detect hostile submarines.

Bearing

The direction in degrees from a detecting unit to a contact.

Bridge

The place within a ship where navigation and piloting occurs.

Call Sign

In computer *Harpoon* each unit and group has a call sign. Groups have a three letter call sign, a BLUE group might be AAS, while a RED group could be ZZS. Units within a group share the first two letters of the Group call sign, with a two digit unit indicator (ie. the first unit of Group AAS would have the call sign of AA01). The third letter of the Group call sign indicates the known group type, namely:

- C Carrier Group
- S Ship Group
- U Submarine Group
- A Plane Group
- H Helicopter Group
- M Missile Group
- T Torpedo Group
- a Airfield Group
- p Port Group
- b Airfield and Port Group

Caesar

The Soviet fixed seabed passive sonar sensor system, located on the ocean floor in the North Sea.

Cavitation

Submarine and surface ship propellers create small bubbles in the water if they spin at high speeds. These small bubbles almost immediately collapse, creating a sound called cavitation noise. As submarines go deeper, the pressure allows their propellers to spin faster without creating this sound.

CG	Cruiser Guided Missile. American designation for any cruiser armed with surface-to-air guided missiles.
Chaff	Strips of metallic foil, cut to the wavelengths of specific radars, used for jamming.
CIC	Combat Information Center, the tactical center of the ship, where enemy contacts are plotted and tactics planned and executed.
Class	In <i>Harpoon</i> this refers to a specific platform type of which there may be many individual members. For example, the Iowa class of Battleships includes the Iowa, New Jersey, Wisconsin and Missouri as members of that class of ship.
CPSU	Communist Party of the Soviet Union.
CV	American designation for any aircraft carrier.
CVBG	American designation for an aircraft carrier battle group.
CZ	Convergence Zone used in Sensor Screen displays.
D	Dipping Sonar used in the Sensor Screen displays.
DD	American designation for any destroyer.
DDG	Destroyer Guided Missile. American designation for any destroyer armed with surface-to-air guided missiles.
Director	A sensor specific to a particular weapons mount, used to target the weapon before and/or during firing.
ECM	Electronic Counter Measures. Any device or system capable of either jamming or deceiving enemy radars.
ELINT	Electronic Intelligence. The identification of specific enemy radars, as well as the platforms employing these radars, by the analysis of received radar signals.



Endurance	In <i>Harpoon</i> this refers to airborne endurance (ie. how far you can go before running out of fuel). By using the range circle options, you can visually determine your endurance distance for a currently set altitude and throttle setting.
ESM	Electronic Support Measures. Any system capable of detecting and analyzing enemy radar signals.
FF	American designation for any frigate. Frigates are normally smaller than destroyers.
FLIR	Forward Looking Infrared sensor, carried by some aircraft and used to spot surface ships and surfaced or snorkeling submarines, used in the Sensors Screen displays.
GIUK GAP	Greenland-Iceland-United Kingdom. The opening between Iceland and the Faeroe Islands, leading to the straits between Scotland and Denmark.
Group	A collection of one or more Units within computer <i>Harpoon</i> . Most of your orders are given to Groups.
H	Hull Sonar, used in the Sensors Screen displays.
H/T	Combination Hull/Towed sonar, used in the Sensors Screen displays.
HF	Height Finding air search radar, used in the Sensors Screen displays.
Hunter-Killer	A naval unit whose purpose is to seek out and destroy enemy submarines.
IR	Infrared, detecting radiating heat.
KB	Kilo Byte, or 1,024 bytes of information.
KGB	Governmental branch of the Soviet Union responsible for State security. Combines the functions of the American CIA, FBI, and NSA.

Knot	Nautical miles per hour. A nautical mile is about 14% greater than a statute mile.
LD/SD	Airborne Look Down/Shoot Down radar, used in the Sensors Screen displays.
Loadout	In computer <i>Harpoon</i> this refers to an aircrafts' specific ordinance load for a given mission type.
LOC	Line of Communication. Military term for any supply line extending from a country engaged in hostile activities to the front lines.
LR	Long Range.
M	Mine Hunting Sonar, used in Sensors Screen displays.
MAD	Magnetic Anomaly Detection. A system which is capable of sensing disturbances in the earth's magnetic field caused by the presence of a large metallic object, such as a submarine.
MB	Mega Byte, or 1 million bytes of information.
Mount	A weapons mount in <i>Harpoon</i> . A mount contains a weapon, the ready ammunition for that weapon and possibly a sensor used to target the weapon, called a director.
NATO	North Atlantic Treaty Organization, comprised of the United States and her European Allies.
nm or NM	Abbreviation for Nautical Mile.
OTH	Over the Horizon radar (normally land based), used in the Sensors Screen displays.
Picket	A scout, looking for the enemy. In <i>Harpoon</i> this normally refers to the Picket Zone of your formation, the outermost ring.

Platform	Any vehicle capable of carrying a weapons system.
PR	Periscope Radar, used in the Sensors Screen displays.
Radar	Radio Detection and Ranging. A sensor system capable of detecting targets by way of reflected electromagnetic energy.
RIM	Department of Defense designation for any ship-launched anti-aircraft guided missile.
RO	Airborne Range Only radar, used in Sensors Screen displays.
S	Sonobuoys, used in Sensors Screen displays.
SAG	Surface Action Group. A Surface action group is centered on one or more powerful surface ships such as cruisers and/or battleships, and includes several escort ships for protection. Its mission is to provide heavy firepower when needed, as in support of an amphibious landing.
SAM	Surface-to-Air guided missile.
Side	In computer <i>Harpoon</i> , the alliance to which a Group or Unit belongs, represented as BLUE, RED or NEUTRAL (Yellow).
Sonar	Sound Navigation and Ranging. A sensor system capable of detecting underwater targets whether actively (i.e., through reflected sound waves) or passively.
Sonobuoy	An expendable sonar device used in anti-submarine warfare, normally dropped by aircraft.
SOSUS	The NATO seabed passive sonar listening system.
SOW	Stand-Off Weapon. Normally applied to an anti-submarine weapon (torpedo or depth charge) attached to a rocket booster.

SPIR	Shipboard Passive Infrared sensor, used in the Sensors Screen displays.
SR	Short Range.
SS	Either a Surface Search radar or the designation for a Diesel (non-nuclear) Attack Submarine, dependent on context.
SS-N-21	A type of Soviet cruise missile carrying a nuclear warhead.
SSBN	Submarine Ballistic Nuclear. American designation for any nuclear-powered submarine armed with intercontinental ballistic missiles.
SSM	Surface-to-Surface guided missile.
SSN	Submarine Nuclear. American designation for any submarine propelled by nuclear power.
T	Towed array sonar, used in Sensors Screen displays.
Thermal Layer	The depth at which a sudden temperature change creates a 'layer' that tends to reflect sound waves, reducing sonar effectiveness. Also called the Thermocline.
Towed Array Sonar	Any sonar device capable of being towed behind a surface ship. The advantage of a towed array sonar is that it can be employed beneath ocean thermal layers where a submarine might hide.
TVD	Soviet Intermediate High Commands in the various theaters of operation. TVDs are subordinate to the VGK (the Supreme High Command).
Unit	In <i>Harpoon</i> , a unit consists of any single ship, submarine or base. Missiles, Torpedoes and Aircraft can have multiple members in a single unit, but must share the same target or Loadout.

VDS	Variable Depth Sonar, normally a towed array sonar that can vary its' depth, allowing it to listen both above and below the thermal layer, used in the Sensors Screen displays.
VGK	Supreme High Command of the Soviet Union responsible for all military actions. Comprised of the Minister of Defense, his five commanders-in-chief, plus six other deputy Defense Ministers for civil defense and other matters.
VTOL	Vertical Take-off and Landing. Abbreviation for any fixed-wing aircraft capable of a direct vertical take-off.
WARSAW PACT	The Soviet equivalent of NATO, comprised of the Soviet Union and her eastern European allies.

Warranty



Three-Sixty Pacific Ninety-Day Limited Warranty

To the original purchaser only, Three-Sixty warrants the magnetic diskette on which this software product is recorded to be free from defects in materials and faulty workmanship under normal use for a period of ninety days from the date of purchase. If during this ninety-day period the diskette should become defective, it may be returned to Three-Sixty for a replacement without charge, provided you have previously sent in your Warranty Registration Card to Three-Sixty or send proof of purchase of the program.

Your sole and exclusive remedy in the event of a defect is expressly limited to replacement of their diskette as provided above. If failure of a diskette has resulted from accident, abuse or neglect, Three-Sixty shall have no responsibility to replace the diskette under the terms of this limited warranty.

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